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NATIONAL AQUACULTURE ACT OF 1979

JOINT HEARINGS

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

AND THE

SUBCOMMITTEE ON AGRICULTURAL RESEARCH AND GENERAL LEGISLATION

OF THE

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

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UNITED STATES SENATE

NINETY-SIXTH CONGRESS

FIRST SESSION

ON

S. 1408

A BILL TO PROVIDE FOR THE DEVELOPMENT OF AQUACULTURE IN THE UNITED STATES, AND FOR OTHER PURPOSES,

AND

S. 1650

A BILL TO PROVIDE FOR THE DEVELOPMENT OF AQUACULTURE IN THE UNITED STATES, AND FOR OTHER PURPOSES

AUGUST 16, 1979—HONOLULU, HAWAII
NOVEMBER 14, 1979

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CONTENTS

THURSDAY, AUGUST 16, 1979

CHRONOLOGICAL LIST OF WITNESSES

SUBMITTED STATEMENT

WEDNESDAY, NOVEMBER 14, 1979

CHRONOLIGICAL LIST OF WITNESSES

Digitized by Google

APPENDIX

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APPENDIX

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NATIONAL AQUACULTURE ACT OF 1979

THURSDAY, AUGUST 16, 1979

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Honolulu, Hawaii.

The committee met at 9 a.m. in Courtroom No. 3, Prince Kuhio Federal Building, Honolulu, Hawaii, Hon. Daniel Inouye presiding.

OPENING STATEMENT BY SENATOR INOUYE

Senator INOUYE. The Senate Committee on Commerce, Science, and Transportation will now consider S. 1650, the National Aquaculture Act of 1979.

It is with great pleasure that I welcome all of you to these first hearings on S. 1650, the National Aquaculture Act, a bill that I recently introduced.

Aquaculture, the cultivation of aquatic plants and animals, has tremendous potential for increasing the world's food supply. This potential has been clearly demonstrated in other countries, particularly in Asia. Yet aquaculture development has lagged far behind in the United States. While there are many reasons for this, the Federal Government has to accept a large share of the blame because of its historic failure to recognize the importance of aquaculture. S. 1650 is intended to reverse this situation.

It is therefore altogether appropriate that we are holding these first hearings on the bill here in Hawaii. Hawaii is a leader in the United States in recognizing the potential of aquaculture and in committing the resources necessary to achieve it. Hawaii has established the first comprehensive aquaculture development program in the United States, which serves as a model for the Federal Government and other States. Hawaii is also engaged in many activities to assist aquaculture, including loan programs, marketing studies, disease control, and extension/advisory services. This bold commitment serves as a lesson to the rest of the country on the potential importance of aquaculture.

Before we begin discussing S. 1650, I would like to give you a brief update on the progress of aquaculture legislation in Washington.

Last year, at the close of the 95th Congress, the Congress passed H.R. 9370, a bill which was intended to achieve the goal of aquaculture development. President Carter pocket-vetoed that bill, primarily because it contained financial incentive programs which would have provided loan guarantees and insurance to the aquaculture industry. While I still believe that a need for these programs has been clearly demonstrated and that the benefits would far exceed the costs, I have

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deleted this program from this bill in an effort to provide the basis for strong administration support both for this bill and for the development of aquaculture.

In fact, since last year's pocket-veto, I have been encouraged by the administration's efforts to carry out, under existing authority, many of the actions which we called for in last year's bill. A Joint Subcommittee on Aquaculture, an interagency coordinating group under the auspices of the White House Office of Science and Technology Policy, has been established and is currently in the process of formulating a national aquaculture plan, as called for in last year's bill. In addition, the subcommittee is undertaking studies of the need for new financial incentive programs for aquaculture, and the effects of regulatory constraints on aquaculture. S. 1650 would formalize these activities and provide the subcommittee with a legislative mandate. The bill is very similar to a version of last year's bill which the Office of Management and Budget has indicated it would find acceptable, and I am very hopeful that the administration will strongly support this measure.

In short, this bill finally recognizes the high priority which aquaculture development deserves and, if enacted, will constitute a major step in achieving that development. This is not to suggest that no future aquaculture legislation will be required, but this bill will provide a strong foundation for any future action.

The committee's purpose today is to listen to all of you to find out the current status of aquaculture in Hawaii and to find out your feelings about S. 1650.*

Without further ado, I would like to welcome the chief executive of the sovereign State of Hawaii, Hon. George Ariyoshi, Governor, and thank him for taking time from his very busy schedule to lend his support to aquaculture.

Mr. Governor, I am pleased to have you with us, sir.

STATEMENT OF HON. GEORGE ARIYOSHI, GOVERNOR OF HAWAII

Mr. ARIYOSHI. Thank you, Senator Inouye. I want to express my appreciation to you for taking the time to come back to Hawaii and to listen to testimony on this very important subject matter.

I am pleased to present my views on the proposed National Aquaculture Act of 1979, S. 1650. This measure, introduced by you, Mr. Chairman, has the worthy goal of declaring that it shall be our national policy to foster aquaculture throughout our country, and to establish a National Aquaculture Council, composed of various Federal agencies with responsibilities in this field, which will draw up a comprehensive national plan for this industry's expansion.

Few measures are potentially as important as this aquaculture bill for the future of our Nation, and indeed for the future of the world. America's historic genius and greatness have been clearly shown in innovative mass production of vast quantities of food, clothing, shelter, transportation, and amenities for millions, at reasonable cost, and with reduced drudgery for workers.

The industrial revolution had its roots in England but it blossomed in America; the scientific agriculture revolution had its roots in Amer-

* See p. 153.

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ica; and now America has an opportunity to promote another great economic revolution by deriving vast quantities of food and other products from aquaculture.

Such a revolution has been gaining momentum for some time now, and I am happy to report that Hawaii is in its forefront, through its pioneering work in helping aquaculture go beyond the laboratory and research centers and into extensive commercial production. Other States also are producing aquaculture products and see the potential of this industry.

During this hearing, State and county leaders and experts from private industry will be providing testimony that will reflect both enthusiasm and caution. Their testimony will present encouraging details of Hawaii's progress in aquaculture, as well as provide insights and information of great value.

I favor the basic thrust of this bill. It will be an historic step forward for our country when it is passed. As with all pioneering legislation, it will be considered too limited, too confining by some; or too broad, too progressive by others.

All will agree, however, that it is a positive and encouraging move. For Hawaii, it will mark a ratification of our years of planning in a field which not so long ago was believed to be too esoteric for practical businessmen. Today, our Hawaiian prawns and other aquaculture products use hundreds of acres of ponds to produce hundreds of thousands of pounds of delicious food for our Islanders and for export overseas.

In our islands, visionary legislators and government officials worked with the private sector to establish a very firm base of scientific knowledge and production experience in aquaculture.

What is needed now is commercialization on a vast scale. This bill is an essential step toward that anticipated achievement.

Mr. Chairman, I feel it is essential to point out that without your dynamic leadership in Congress, aquaculture might be a lost cause in America.

We hope that you will continue to be a leader in this field, and that you will be able to enlist the help of your colleagues in starting America firmly on the road to what we hope will be a major new industry for the future, an industry which will help to nourish a hungry world without depleting national resources or disturbing our ecology and environment.

It is my personal hope that a parallel effort in alternate energy resources development will provide much of the energy required for growth of this new industry.

I believe that this parallel growth of aquaculture, and renewable and essentially inexhaustible energy resources will prove once again that the genius of American innovation and productivity can revolutionize the world.

Mr. Chairman, I am very grateful for the opportunity to be here today.

Senator INOUYE. Governor, I thank you very much and wish to commend you for your support and leadership in this field. Under your guidance and leadership, Hawaii has now become the first State in aquaculture. I think that the rest of the Nation has much to learn from us here.

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Thank you very much for taking part in this. We appreciate it.

Mr. ARIYOSHI. Thank you.

Senator INOUYE. Our next witness will be Hon. T. C. Yim, member of the Senate of the State of Hawaii.

STATEMENT OF T. C. YIM, HAWAII STATE SENATOR

Mr. YIM. Thank you, Mr. Chairman.

Senator INOUYE. Senator Yim, it is always a pleasure to have you with us, sir.

Mr. YIM. Senator Inouye, Dan, welcome home.

Senator INOUYE. Thank you.

Mr. YIM. It gives me a great deal of pleasure to testify before you on S. 1650.

In my role as chairman of the State senate committee on economic development, I have had the responsibility of conducting hearings and developing legislation to foster aquaculture in Hawaii. And, I am pleased to see that the Federal Government is now on the verge of launching a major effort in an area which is so vital to our State and our Nation as well.

The Legislature of the State of Hawaii has been in accord with aquaculture development for a number of years. Through the budgetary process, the legislature has been instrumental in coordinating the aquaculture activities of the various State agencies and the private sector. In early 1976, as a result of recommendations emanating from a preliminary State study on aquaculture, the legislature appropriated $150,000 for a comprehensive evaluation of the opportunities for aquaculture in the State of Hawaii. This evaluation identified a number of important opportunities in marine and freshwater aquaculture. It further revealed that an aquaculture research industry could play a significant role in the future economic development of the State of Hawaii.

Pursuant to the 1978 evaluation report, the 1978 and 1979 Hawaii State Legislature provided funds for a comprehensive aquaculture development program to expand Hawaii's fledgling aquaculture industry. This vital program has a broad-based statewide support, including the firm commitment of the legislature, the various executive agencies engaged in aquaculture activities, and the private sector.

The latest figures I have seen regarding Federal aquaculture expenditures reveal that in 1975, the U.S. Government invested $16 million in aquaculture research and development. In 1978, the Hawaii State Legislature appropriated over $2 million for aquaculture, or about 12 percent of the Federal expenditure. While the figures presented are a rough comparison over several years, I merely wanted to illustrate Hawaii's sincere commitment to aquaculture.

Of the $2 million appropriated in 1978, $1.2 million were designated for the construction of a new aquaculture experiment station. This station is currently designated to become a part of a combined aquaculture-agriculture experimental facility at Waialee, Oahu. We view this undertaking as a major step in making Hawaii a center for aquaculture research in the United States as well as in the world. This facilty will be utilized jointly by the various State agencies, the University of Hawaii, and the private sector.

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The results of the statewide support of aquaculture have been dramatic. For example, during the past year, the Hawaii prawn industry has expanded to nearly 240 acres in production. By the end of the year, the acreage in active production is expected to total 340 acres and in 1980, possibly approach 600 acres. In addition, important new endeavors are developing in the culture of oysters and marine shrimp. Recently, the Oceanic Institute, a private nonprofit research institute which I believe to be the State's largest marine aquaculture research facility, has made exciting breakthroughs in the culture of marine shrimp. Another area of aquaculture research which has received scant notice till now is the merging of agriculture and aquaculture. The successful demonstration of this concept is of great interest and vital importance to many of the lesser developed nations of the Pacific basin. The foregoing programs are being accorded high priority by the College of Tropical Agriculture and Human Resources of the University of Hawaii and the Oceanic Institute.

Various organizations in the State of Hawaii have already established contacts with other nations within the Pacific area to foster cooperation in the development of tropical aquaculture. We in the State of Hawaii are firmly committed to serve as an example in aquaculture development and to help in the transfer of aquaculture technology throughout the Pacific basin and the world.

To summarize, I want to reemphasize the solid commitment of the Hawaii State Legislature to the development of aquaculture. I also want to strongly stress the fact that Hawaii has played and will continue to assume a vital role in the future of aquaculture in the United States. Here in Hawaii, we now possess a high degree of scientific and technical expertise in the field of aquaculture. We also have the facilities and are blessed with a favorable climate. But even more importantly, the people of Hawaii are united in a firm mutual pledge to assume a responsible and active role in this important new endeavor.

Senator Inouye, you are to be commended for your extraordinary vision in sponsoring this far reaching piece of legislation. Enactment of this important bill, S. 1650, will heighten national awareness of the innumerable benefits that can flow from a viable and broad-based aquaculture industry. Enactment of the bill will also cast the die for the forgoing of a vitally needed working partnership between the Federal Government and the States. I perceive such a partnership as the key to the growth of a successful aquaculture industry in Hawaii and throughout the Nation as well.

In my humble judgment, I believe the development of a viable aquaculture industry industry will be a vital new force in bolstering our national econmoy. And possibly, more importantly, a thriving aquaculture industry will also contribute directly to the noble humanitarian goal of alleviating the world hunger problem.

We are honored and pleased that you are holding this hearing on aquaculture in Hawaii. We pledge to work closely with you in every way possible to make this existing dream come true.

Mahalo.

Senator INOUYE. Thank you very much, Senator Yim. Under your persistent and farsighted leadership, the State legislature has gone far beyond that of any other State in its commitment to aquaculture.

Do you have any agenda for future action? And what do you foresee as the role that the State government plays?

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Mr. YIM. I believe the heart and soul of a viable aquaculture industry for commercialization is to develop the scientific brain nationally and in the State. And we should do everything to encourage the development of the brain power. And, for Hawaii, it would be developing our university. We have not quite touched an area that we need to really look into, even though the University of Hawaii did designate the College of Tropical Agriculture to be the lead agency there.

About a year or so ago, one of the scientific brains of the world, an aquaculture scientist from Israel, did make a proposal as to how the University of Hawaii can revamp its program there. So, one of the highest priorities in the year ahead would be to make sure that the university is geared and is prepared should such a bill such a S. 1650 be passed.

So, I do believe the need to quickly develop the scientific brain is—even though we need to import some of them from elsewhere.

Senator INOUYE. You have identified a working partnership between the State and the Federal Government as a key to the success of this endeavor. What do you perceive to be the role of the Federal Government?

Mr. YIM. I perceive the role of the Federal Government is to lend support financially in certain areas where we do know the State is not able to finance on the joint venture. I see there is a need for Federal help for information collection exchanges as provided in S. 1650.

Much of what I see in S. 1650 will do the job. The financing, the need to exchange information to coordinate the efforts nationally so that we do not duplicate the efforts or reinvent the wheel. I think in these areas, it would be of great help to the State.

Senator INOUYE. Senator Yim, it may interest you to know that the legislation was in great part drafted following the model that you have set for the State of Hawaii. So, knowing that your efforts have been successful, I am certain that the Federal efforts will be similarly successful.

Thank you very much for your contribution this morning.

Mr. YIM. Thank you very much.

Senator INOUYE. We are now pleased to have with us the distinguished president of the Hawaii State Senate, the Honorable Richard Wong.

STATEMENT OF RICHARD WONG, PRESIDENT, HAWAII STATE SENATE

Mr. WONG. I'm sorry to be late, Senator.

Senator Inouye and members of the committee, I am Richard Wong, president of the Hawaii State Senate. I am very pleased to have this opportunity to provide testimony on S. 1650.

I must say that I note with pleasure that the State of Hawaii is one of the Nation's leaders in aquaculture. I think this is because the nature of our geographical makeup and our location is ideally suited toward aquaculture development. The very nature of our island State and its isolated existence from the continental United States has created unique economic problems for Hawaii and has necessitated development of diverse economic activities utilizing our natural physical resources. Aquaculture affords us a potentially strong economic activity that will help lessen our dependency on the sugar and pineapple

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industries which are declining, on Federal expenditures, and on the vagaries of the tourist industry.

The Hawaii Legislature has long recognized the potential of aquaculture in Hawaii and has provide strong support over the years for its development. The commitment of the State legislature, strong administrative support, and Hawaii's superb climate, expertise, and facilities all point to Hawaii's ability to play a vital role in the future of aquaculture in the United States.

S. 1650 will provide the basis for a strong National/State partnership, a partnership that is necessary and long overdue. There are areas in which the National and State efforts can be mutually supportive—in developing marketing programs for exporting aquaculture products, establishing financial incentive programs, exploring effects of regulatory controls on the industry, and coordinating research efforts focusing on aquaculture's contribution to solving the world food problem. Thus, your proposed National Aquaculture Act only reaffirms our commitment to aqaculture development in Hawaii.

In closing, Senator, I support S. 1650, and I pledge continued support from the legislative toward aquaculture programs in Hawaii.

Thank you very much.

Senator INOUYE. Thank you very much, Mr. Wong, for your support and leadership in this area. It has undoubtedly been very vital in assuring that Hawaii would remain No. 1 in this area.

I note that last year your legislature appropriated $2 million for this activity. Do you expect the next legislature to be as generous?

Mr. WONG. I would say that a commitment was made about 4 years ago to a strong impetus toward development of aquaculture as a viable and an export industry. And, I am sure that the appropriation provided will continue to be at the existing level, if not increased.

I would like to make this statement, that I think the previous speaker, Senator Yim, in the years that he has served in the legislature has been a strong advocate of aquaculture in Hawaii, and has worked very closely with the top people in and out of Hawaii to try and develop this particular industry. And I think at this time it would be appropriate, Senator, that we give credit to the Governor who has fostered and encouraged the growth of this industry.

And I think the commitment of Hawaii is solid, it will continue. I am not afraid to say here that the appropriation levels within the State budget will be increased, hopefully in collaboration with the Federal Government. We in Hawaii have a strong commitment to aquaculture, not only for Hawaii and for our own export purposes, but to show the rest of the world that it can be done. And I know, Senator Inouye, that you have followed aquaculture for many years and you have seen it develop. It is going to be right on. Here in Hawaii it will be good for the people in terms of jobs and expanded economic opportunities.

There is an area where I have some reservations, and that is how to tie this development into the preservation of our environment. I think there are some rules and regulations in the EPA which makes it very difficult for some of the people who are interested in getting into the field to start going. I hope that your bill will address the issue of the controls that the Federal Government will exercise as balanced against the encouraging of this industry to grow.

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I know that's a very long answer to a very short question, but I felt that I need to say this because I think it is very important to the future of Hawaii.

Senator INOUYE. I am looking forward to continued leadership on your part in support of this program.

It may interest you to know that as a result of the recent trade negotiations, the United States has finally come to the realization that aquaculture is a good dollar item. I don't think too many of our negotiators realized how much we were importing, and in terms of dollars it's in the multi-millions. I think the administration is now fully supportive of not only being self-sufficient, but hopefully someday to be an exporter of aquaculture products.

So, under the leadership of Hawaii, I think the Nation may some day soon catch up with rest of the world.

Thank you very much.

Mr. WONG. Thank you very much, Senator.

Senator INOUYE. Our next witness is the director of the department of planning and economic development for the State of Hawaii, Mr. Hideto Kono.

It's always good to have you with us, Mr. Kono.

STATEMENT OF HIDETO KONO, DIRECTOR, DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT, STATE OF HAWAII

Mr. KONO. Thank you.

Mr. Chairman, I am pleased and privileged to present testimony of the State administration, representing the combined comments, opinions and suggestions of our State departments of planning and economic development, land and natural resources, and agriculture, and reflecting our unified desire to see aquaculture advance still further both in Hawaii and throughout the rest of the United States.

The State of Hawaii has a tradition of fishfarming that extends back some 600 years. There were approximately 360 fishponds in the islands prior to the arrival of Capt. James Cook in 1778, with a total annual production calculated to be over 2 million pounds. Production and ponds experienced a decline in the early part of this century due to such factors as natural erosion, lava inundations, destruction by tidal waves, and landfilling for shoreline development. Aquaculture persisted, however, gradually assuming a renewed significance in the late 1960's with the importation and commercial testing of the Malaysian prawn by the State department of land and natural resources. This program, which provided juvenile prawns and extension/advisory services to farms, established Hawaii as the world leader in the culture of freshwater prawns and pointed to the enormous potential of aquaculture as a means of economic diversification for the State.

Today, increasing population pressures on the world's limited food resources, coupled with escalations in energy costs, have emphasized the necessity of developing new methods of food production. Moreover, of primary concern in developed countries in the recent search for industries that are both environmentally clean and able to provide tax revenues and employment opportunities, particularly for communities that traditionally have been agricultural. Aquaculture is a multifaceted economic development alternative capable of meeting these needs.

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Our State—the only one among 50 with yearround relatively even climatic conditions, favoring rapid growth of certain aquatic species—is committed to realizing this potential. The State administration spent 2 years preparing the first comprehensive statewide aquaculture development plan in the Nation, which was published in November 1978. The plan, entitled "Aquaculture Development for Hawaii," incorporates information from previous assessments, and adds a wide range of material to provide a comprehensive treatment of aquaculture in the State.

The purposes of the plan were to asess Hawaii's resources for aquaculture and identify constraints to development; to set a State goal for aquaculture development in Hawaii; to define the objectives and policies necessary to realize this goal; and to recommend programs, an effective organization, management strategies, and a budget and timetable for the achievement of these objectives and policies.

Mr. Chairman, we are pleased to note that many of the ideas incorporated into Hawaii's State aquaculture plan are reflected in S. 1650. We are aware that many of our Nation's aquaculture leaders have requested copies of Hawaii's plan and we sincerely hope that they will find portions valuable in the formulation of the national program.

Aquaculture development activities have increased at an accelerated pace since the publication of this plan. Our 1979 State legislature considered more than 50 bills and resolutions relating to furthering aquaculture development in Hawaii. The legislature responded to the potential for State aquaculture development by providing more than $1 million in funding for research and development work. The University of Hawaii College of Tropical Agriculture and Human Resources has begun the planning of a tropical aquaculture center for conducting aquaculture research and development. The university's sea grant college program has funded research and production improvement projects for topminnows and freshwater prawns. Our State aquaculture loan program located in the department of agriculture has made a number of loans to private entrepreneurs. The department of land and natural resources Anuenue Fisheries Research Center has expanded its freshwater prawn hatchery and expanded the array of extension advisory services it provides to Hawaii's prawn farmers. The aquaculture development program, which is located in my department, will be funding more than $400,000 in research and demonstration projects, as well as providing assistance in market development, permit and regulatory procedures, information gathering, disease diagnosis and prevention, and site location and assessment.

We are fully aware, of course, that beyond a certain point the involvement of private organizations and risk capital is critical to further development and expansion of the aquaculture industry. The Oceanic Institute, a private nonprofit research organization, is continuing to make great strides in the hatchery production and grow-out of mullet, milkfish, and marine shrimp. This organization is also expanding its cooperative aquaculture research efforts to joint programs with laboratories around the Asian-Pacific basin. The Hawaii prawn industry has more than doubled in size since last year. By the end of 1979, it is estimated that 350,000 pounds of prawns will be marketed locally at an average wholesale price of $4 a pound. Projected production for 1980 is about 1 million pounds with a significant

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portion of this production being exported to Japan and the mainland. Of importance also is that farmers have joined together into a Hawaii prawn producers association and are beginning to look toward formation of a cooperative. Other species are also being commercially cultured, such as oysters, catfish, brine shrimp, mullet, and ornamental fish. And new species are presently being demonstrated, such as topminnows, seaweed, and marine shrimp.

Clearly, Mr. Chairman, aquaculture, a venerable island tradition, is leading Hawaii to new economic opportunities. We project that by 1985 the industry could be valued at $32 million and employ directly and indirectly more than 900 people. Carrying these projections even further, our goal for the year 2000 is an industry valued by valued at more than $300 million and employing more than 9,000 persons. However, we in Hawaii realize that these goals cannot be reached without the assistance of the Federal Government and the cooperation of all agencies which have a role in national aquaculture development. We appreciate that cooperation and are grateful for it.

In this regard, we find S. 1650, the National Aquaculture Act of 1979, a positive step toward a unified and concerted national effort to develop this fledgling industry to its full potential. The bill recognizes the diversity of benefits which can be obtained from optimal stocking and management of animals and plants in controlled aquatic systems. Moreover, it calls for the promotion of aquaculture in the United States by declaring a national policy, establishing and implementing a national aquaculure development plan, and encouraging both public and private sector aquaculture activities. This will result in increased aquacultural production, the coordination of domestic aquacultural efforts, the conservation and enhancement of aquatic resources, the creation of new industries and job opportunities, and other national benefits.

Mr. Chairman, in general, we find that the provisions of this act address in large measure widely recognized and extremely important constraints to development. Moreover, the provisions ameliorate certain jurisdictional problems which have effectively stalled progress in recent years. However, we would like to offer the following comments on certain aspects of the act.

The State of Hawaii strongly feels that a widely accepted national policy would spur a rapid growth of the aquaculture industry. We suggest that such a policy should accomplish the following: First, it should define aquaculture as a form of agriculture subject to the latter's standards and benefits, such as environmental regulations, tax rates, disaster loan, insurance rates, water rates, et cetera. Second, it should recognize and publicize the contributions and current roles of all Federal agencies involved in aquaculture. Third, it should identify the location-specific nature of many problems confronting aquaculture and provide for major State participation in research and development, support services and training through matching programs.

We totally support the establishment of the Joint Subcommittee on Aquaculture for coordinating aquaculture activities. However, we would strongly encourage the development of mechanisms for multileveled input into decisions, particularly for the State governments, private industry, and support industries such as those of feed, drugs, insurance, and investment. Finally, though we recognize the current state of the economy, we believe that some additional financial support

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is needed which will be "paid back" manyfold in new jobs, tax revenues and overall economic activity.

Mr. Chairman, concerning establishing and implementing a national aquaculture development plan, we feel that individual States should assist in establishing development priorities by making known to national leaders their research, training and support service needs. In our view, the reasons for stressing the role of the States are as follows:

First, many problems facing the aquaculture industry today and for the foreseeable future are location-specific and therefore may be more effectively addressed by a localized program.

Second, many of the legal/institutional constraints limiting aquaculture expansion fall under State or local government purview.

Third, the States have the potential for better direct access to private-sector aquaculturists within their boundaries.

And fourth, not all States have the same potential for aquaculture, the same level of activity, nor the desire to see an industry develop. By giving each State an opportunity to participate, we will help those most interested realize their full potential.

In conclusion, we find that the two proposed studies—on capital requirements and on regulatory constraints—address crucial areas. However, we suggest that positive actions in these areas can be taken before these timely studies are completed. For example, a strong step in this direction can be taken by making aquaculture coequal to agriculture, so that there is no question of aquaculture's eligibility for agriculture loans under the statutes.

Mr. Chairman, your efforts on behalf of furthering aquaculture development in the United States are highly commendable and your leadership in this area is the pride of our State. We look forward to continuing our work with you and other national aquaculture leaders so that 1979 can be a banner year for U.S. aquaculture development.

Thank you, Mr. Chairman, for the opportunity to make these comments on behalf of the State of Hawaii and its aquaculture community.

Senator INOUYE. Mr. Kono, the committee is extremely grateful for your analysis of the bill and your suggestions. I must say that I personally agree with most of them. For example, making aquaculture coequal to agriculture. As soon as the Congress gets back into session, I will begin drafting appropriate legislation to bring this about. I think it makes great sense.

Mr. KONO. Thank you, sir.

Senator INOUYE. As to your strong suggestion that several States of the Union be given a larger role in the development and implementation of this plan. Here again I agree with you, but what would you propose as the mechanism to bring this about?

Mr. KONO. One way is for the subcommittee to require from each of the States a comprehensive plan for development as a contribution to the national plan. We would like to present a plan, a comprehensive plan, particularly in the Pacific tropical aquaculture area. I know that you also recognize that Hawaii is now expanding its role and assisting the Pacific islands as well in their own development. We are fully aware of your efforts to help us—not only Hawaii, but the American territories as well—in seeking a Pacific Regional Commission by which we can try to consolidate heretofore very categorical-type grants, and to have America's Pacific areas try to resolve their own problems in a more efficient manner.

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It seems to me that such a comprehensive plan, which would include tropical aquaculture along with agriculture for economic development, and which has a transfer value with the other Pacific islands, would be most appropriate and it would be in the national interest as well. So, to answer your question, Mr. Chairman, the mechanism by which this might be achieved is for the Joint Committee or the Secretaries acting collectively to ask for plan proposals from which the National Government might react and jointly fund and work cooperatively to achieve the advancement of the aquaculture program.

Senator INOUYE. As you may know, the Aquaculture Act of 1977 did in fact neatly place aquaculture in the same category as agriculture. However, for some unknown reason, the U.S. Department of Agriculture has not been too keen about implementing this provision. That's why I am trying to come up with the necessary legislation to prod this USDA to implement the intent of Congress. We hope this will come about soon.

As most witnesses have indicated, Hawaii is a leader in this area, and many States are now looking upon this State for guidelines.

What sort of interaction are you having with other States?

Mr. KONO. We have participated to the extent of attending meetings to discuss common problems. But in this aquaculture area, from a national standpoint, it's merely a beginning stage. So we have not had as many meetings on aquaculture as, for example, we have had in this area of energy. So this act, I'm sure, will precipitate more interchange of technical knowledge, farming knowledge, and I think this, therefore, will be a major contribution along those lines.

We hope that through a national program there will be a data collection center from which we might be able to benefit—every State that's developing an aquaculture program would benefit from the experiences of the other States, as well as from what is happening in the other countries of the world. And we recognize that countries like Israel, China, and others are much advanced in this area.

Senator INOUYE. Well, once again, I thank you very much, Mr. Kono. You have been most helpful, sir.

Mr. KONO. Thank you.

Senator INOUYE. We are most pleased and honored to have with us this morning the distinguished Representative, Mr. Cecil Heftel, Congressman from the State of Hawaii.

Mr. Heftel, welcome.

STATEMENT OF HON. CECIL HEFTEL, U.S. REPRESENTATIVE FROM HAWAII

Mr. HEFTEL. Force of habit, I almost picked up the microphone and put it on.

I am delighted to be here, Senator, and I suppose these hearings are very accurate testimonials to the leadership that you have provided in the area of aquaculture. I think we all know that the legislation which passed the Congress last session was ultimately vetoed by the President. I'm certainly hopeful that we will find that this legislation will meet the objections of the President and will not be vetoed.

I am certainly in total support of an aquaculture policy in America, Hawaii, which recognizes certain salient facts:

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First, the United States should have a national effort which encompasses and regulates the present fragmented efforts of various Federal agencies. There should be an aquaculture policy, not just technology.

Second, a national aquaculture act should recognize that simply increasing the world's fish catch does not represent a prudent approach to increased consumption of the ocean's resources; we will need conservation in the oceans just as we do in agriculture of the land.

And third, an aquaculture policy should take into consideration other goals and aspirations. For example, we could assist our balance of payments and the value of the dollar by importing significantly less seafood. Currently, 60 percent of America's seafood is imported, well over 4 billion pounds a year. Additionally, we should strive to keep the ratio of energy use in aquaculture production in a favorable balance.

In every way, the concept of a national commitment to a vigorous, unified and sensible aquaculture program is an idea whose time has certainly come. To be able to plant and harvest the oceans would be to add seafood as a traditional American food item.

Beyond our own shores, American technology coupled with a definite and dedicated policy, could bring about a tremendous increase in the supply of protein to a hungry and undernourished world. Since that is within our capability, it thus becomes our responsibility.

We know that the current population trends almost certainly mean a shortage of fishery products in the near future. We know that the United States is lagging in production, that we have mismanaged our coastal fishing areas, that our distant-water fishing program is not energy efficient. We also know that an acre of top-quality pasture land can yield 100 to 250 pounds of beef, but that a properly managed and farmed acre of estuary water can yield 100 tons of seafood.

These and many, many other factors of life today mandate that we consider aquaculture from all of its various angles and that we move quickly and decisively to formulate a national program for the benefit of our people and that of the world.

In Hawaii, I think we are all tremendously encouraged by the emphasis on aquaculture research and the importance placed upon it by our community, and particularly by our Government. The Oceanic Institute, whose professionals include a nutritionist and a geneticist, among its other disciplines, has a growing staff and expanding physical facilities. These are but steps on a long, long journey, which should end without intelligent use of the seas for this and future generations.

I think finally and, perhaps, most important of all, we will not see any of this occur until we have the legislation, because from my short period of time in Washington and in Congress, it seems that those who are appointed members of the Department of Agriculture and those who are the staff members are parts of the land, and somehow it is foreign to their thinking that we enter into an aquaculture program. That we try to compete with the land, when of course, it isn't a case of competing, but complementing.

And, so, I think that your legislation is critical if ever we are to move forward.

And, again, I thank you for this opportunity.

Senator INOUYE. Thank you very much for taking time out of your very busy schedule to be with us this morning. Your statement has been most helpful, sir.

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Mr. HEFTEL. Thank you.

Senator INOUYE. Thank you very much.

Our next witness is the Acting Dean of the College of Tropical Agriculture at the University of Hawaii, Noel P. Kefford.

Dr. Kefford, welcome sir.

STATEMENT OF DR. NOEL P. KEFFORD, ACTING DEAN, COLLEGE OF TROPICAL AGRICULTURE, UNIVERSITY OF HAWAII

Dr. KEFFORD. Thank you, Senator. Dean William Furtick apologizes for not being here today. It so happens that this day he is meeting with four other State universities for the planning of a consortium so that the collective abilities and attributes of those institutions can be used for tackling aquaculture problems.

I am pleased to testify today in favor of this bill. Senator, the primary reasons for my support have already been stated by you in the Congressional Record of August 2, 1979. I agree that this legislation, if it is wisely implemented by the Federal agencies, will provide for the development of aquaculture in the United States.

The College of Tropical Agriculture and Human Resources has a strong interest in the support of the aquaculture industry in Hawaii. In its role as a land-grant institution, the University of Hawaii seeks to assist this agricultural enterprise by a combination of research, teaching, and extension activities. I would like to summarize some of these activities for you.

In the area of research, we are primarly involved in investigations of four types of aquaculture systems: Malaysian prawn pond culture, mullet and milkfish pond culture, marine-shrimp pond culture, and polyculture systems with prawns and carp. Lead research responsibility in all of these cases has been with groups outside the college, but our researchers have made contributions to specific aspects of these studies. The college is moving increasingly into a leadership role, however, as it expands its staff and facilities.

The areas in which the college plays an active research role cover a wide range of disciplines. For example, we have studies on the nutritional value of the different plants which occur in the ponds, which should lead to less expensive feeding requirements; studies on food processing of aquacultural products, which should enhance the quality of the cultured animals and perhaps increase the possibility of developing export markets. And, genetic studies, leading to enhance domestication of wild species. In all, we have several dozen studies underway.

The college also offers practical courses on the management of aquaculture facilities. This is supplemented by a variety of courses basic to the scientific study of problems which are common to aquaculture.

Our involvement in formal extension programs with aquaculture is relatively limited at present. However, the college has made substantial contributions in the form of technical information supplied to the aquaculture industry through the efforts of our research investigators as they work with farmers on specific problems. Examples of these are engineering innovations for feeding, pond aeration, and harvesting in prawn farms.

We expect to increase our activities substantially in each of these three areas of research, extension, and instruction over the next few

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years. The addition of the aquaculture field facilities in conjunction with the Livestock Research Station at Waialee is an important element in our ability to expand.

Another facet of our activities, which is a direct benefit to the State's aquaculture programs, has been the establishment of institutional linkages to strong research programs in other States and nations. This will continue to allow us to share promptly with the results of research conducted elsewhere. We will continue to seek such opportunities so that we can maximize our statewide impact while operating with relatively limited funding.

In this regard, I would like to note particularly the cooperation which exists between the college and two other aquaculture research organizations with which we have close ties in the State—Anuenue Fisheries Research Center and the Oceanic Institute. Both of these groups have set a pattern for international institutional cooperation which the college is attempting to emulate.

I would like now to comment on the bill itself, in the context of the research and development role of the college.

In examining this bill, it is apparent that the national aquaculture development plan will guide the activities of the Federal agencies as they support research and development activities in the field of aquaculture. As proposed, the plan is to be specified along species lines. In particular, it will focus activities on those species which have a significant potential for culturing on a commercial or other basis. As a result, it will become all important for a species to gain such recognition if it is to qualify for Federal matching funding support.

Within a university environment, this may be an unacceptable constraint if this legislation is restrictively interpreted. And there is some reason to believe that this might be the case. Our preliminary discussion with members of the Federal agencies indicate that only 11 or 12 species are being considered for initial inclusion in the plan.

In a technical assistance and demonstration context, this may be a reasonable number of species to receive attention at any particular time. But, I fear that this small number will unnecessarily limit the broad-based research effort which must be underway if the potential contribution of aquaculture is to be realized.

As an example, let me note that the initial list does not include any plant species. Yet in Hawaii, research carried out in the university has developed a very successful aquaculture industry where marine plants are harvested for their chemicals. These chemicals are important to both the food and drug industries. This represents one of the best known examples of a viable, new aquaculture industry. Yet under the anticipated application of the national aquaculture development plan, such research would have been difficult to initiate.

It should also be noted that the initial species list apparently does not include any species which have potential as animal feed, oil, or energy crops. Yet the economic role of such species, in these times of increasing energy costs, should not be underrated. The use of biomass fuels, for example, need not be limited to nonaquatic plants if aquatic plants can be shown to be economically competitive alternatives.

Similar arguments may be made for examining a variety of animal species in a research context. And, in this context we should ask the question, what are the equivalents of guinea pigs in aquaculture sys-

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tems? The point is that some special attention should be given to insuring that research is done on those species for which the aquaculture potential is not yet well known. Only after adequate research is done will a determination of their true potential be possible.

As a result, I would like to offer a suggestion in the form of several alternatives. As I stated earlier, I feel that the bill itself is sufficient as it has been introduced. What I suggest is that the committee, if it agrees with my interpretation of the potential limitation of the plan, recommend to the Secretaries that they attempt to include a relatively large number of species in the plan. Alternatively, the recommendation to the Secretaries might be to fund research on some species which are not in the plan.

The College of Tropical Agriculture and Human Resources is anxious to expand its aquaculture research, training and extension programs. We hope that the national aquaculture development plan recognizes the role which universities can assume and provide for the implementation of well-balanced programs without unnecessary delay.

Thank you very much.

Senator INOUYE. Thank you very much, Dr. Kefford.

Is there a special degree program on aquaculture?

Dr. KEFFORD. Not at present, at the University of Hawaii.

Senator INOUYE. Do you know of any universities on the mainland?

Dr. KEFFORD. Offhand I cannot tell you, but there are centers of aquaculture specialty on the mainland, and I would be surprised if they do not have undergraduate and certainly graduate specialties in aquaculture. Within the University of Hawaii, one can do a degree in zoology which would have an aquaculture bias and direct applicability. A degree in botanical sciences at the graduate level could have a similar emphasis. There are examples in both cases, where the graduates have gone directly into the aquaculture industry. We have graduate students working in agriculture engineering on aquacultural problems. So, in that sense, we do have specific degree programs, particularly at the graduate level, that are directed to immediate and appropriate assistance to the aquaculture industry.

Senator INOUYE. Your comments on the limitations and restrictions on species have been noted. I can assure you that it is not our intention that the interpretation of this bill will be so narrow. So, it will be expanded.

For obvious reasons, we are primarily concerned with aquaculture as it relates to food and drugs, human consumption primarily. Is the University of Hawaii involved in any aquaculture activities related to ornamental, tropical and marine fish and plants?

I ask this, because as you may know, its a multi-billion dollar business in the United States.

Dr. KEFFORD. And as you know, it is an industry in Hawaii.

I think the best answer that I can give is that, as you know, the University of Hawaii has for a long time been occupied with basic research in aquaculture systems. For a greater part of this period the emphasis has been on marine aquaculture, but now we are into freshwater aquaculture. And, these basic principles that have been developed apply to ornamental species as well as to those species which are sources of fuel, food and chemicals.

Senator INOUYE. There are many communities throughout Asia that depend almost solely upon income from the propagation and

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importation of gold fish and other tropical fish. Do you think that type of activity has a potential in this community?

Dr. KEFFORD. My reason for testifying that we should take a broad approach to aquaculture, and the reason why the government of the State of Hawaii is providing a lead in developing a State plan for aquaculture, is specifically so that we can systematically look at each of these potentials; look at the biological possibility, the economic feasibility and the environmental acceptability.

And, I am sure that the State of Hawaii has in mind that our activities would not be limited to food species. And, for the welfare of the State, all species for all potential uses should be investigated. So, my answer would be that we would take a systematic look at a broad spectrum of species for a variety of uses.

Senator INOUYE. I note in your statement that it indicates work on milkfish, prawns, shrimps, and carp. Have we lost interest in the talapia?

Dr. KEFFORD. I do not believe so. Its potential is there and it is being explored along with these other species.

Senator INOUYE. Well, Dr. Kefford, I thank you very much for your contribution this morning. Your statement on the species limitation will be seriously considered.

Dr. KEFFORD. Thank you.

Senator INOUYE. Thank you.

Our next witness is the director of the Oceanic Institute at Makapuu Point, Waimanalo, Hawaii, Dr. Robert Shleser.

STATEMENT OF DR. ROBERT SHLESER, DIRECTOR, OCEANIC INSTITUTE

Dr. SHLESER. Good morning, Senator. I appreciate the opportunity to testify before your committee this morning.

I am the director of the Oceanic Institute, a private nonprofit research institution which is a coparticipant with the College of Tropical Agriculture of the University of Hawaii, the Department of Land and Natural Resources of the State of Hawaii, and the University of Hawaii sea grant program, in a comprehensive action initiated in Hawaii and coordinated by the department of planning and economic development to stimulate the expansion of aquaculture in our State.

Our institution also participates with other research organizations from other countries in programs sponsored by USAID in efforts to use aquaculture to impact on the world food problem.

A recent expansion of our facilities, through support from private foundations and the State of Hawaii, now places the Oceanic Institute in a position to solve production-level problems for marine species which may be important to Hawaii and to other regions in the Pacific Basin.

I am pleased to see that the efforts of our Senators from Hawaii are going to be responsible for providing the United States with an aquaculture program. In reviewing the text of the legislation, I feel that the elements of the bill provide a comprehensive coverage of the important issues affecting aquaculture at this time, and that the bill reflects the accommodations which are necessary to resolve jurisdictional interactions and conflicts that have previously hindered the passage of this very important legislation.

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As a person who has been involved in aquaculture planning at the national level, and also as a relatively recent participant in planning for aquaculture in Hawaii, I am particularly appreciative of the fact that without certain safeguards the national aquaculture plan, which is in progress and is required by your legislation, may conceivably reach conclusions and possibly put into place programs that may disregard the needs and unique opportunities that exist in the State of Hawaii. And, I am pretty much on the tack that Dr. Kefford brought up previously but I would like to take a certain departure from that. As you are aware, a national planning effort is now in progress. As Dr. Kefford mentioned, a list of 22 species which may be reduced to as few as 11 has been developed, and this may ultimately result in programs and programmatic funding decisions which will almost necessarily dictate the kinds of support available to work on each species.

As has been mentioned numerous times this morning, Hawaii has a unique environment. The warm weather and abundance of high quality seawater present opportunities to do things that are not possible in any other region of the United States. Species such as mullet, milkfish, and opihi are mentioned in the Hawaii aquaculture development plan, which is being used as a model for State planning throughout the Nation. However, other species, such as mahimahi, sea bream, and even the loach, appear to be given very little attention. As an aquaculturist in a State whose needs are too often ignored in national planning, I feel it is essential to specifically require that the planning process and the expenditures of the national aquaculture program be carried out in a fashion which is cognizant of local economic opportunities.

The national plan should provide funds for research and development of species which reflect regional and ethnic opportunities and markets. It is essential that the national plan not be written in a way which limits opportunities and options for species already recognized as important for Hawaii or other areas, by specifying the species for which research and development moneys can be supplied by funding entities such as the Department of Commerce, the Department of Agriculture, or others which have been proposed as making the funding decisions.

Therefore, I recommend that the legislation specifically state that the national aquaculture plan and its subsequent funding not exclude species identified by individual States or regions as having potential opportunity, and that certain funding specifically be reserved for work on the development of those kinds of opportunities.

Finally, as the director of the Oceanic Institute, an institution whose major activities are involved with research on species and programs that impact on world food, I would like to call your attention to the importance of using the vast technical expertise embodied in U.S. institutions in the war on hunger. I hope that it may be possible to modify the funding requirements to exclude the necessity of providing matching funds for programs that do not have direct economic benefits for States or industries in the United States. It is the States and industries which generally provide matching funds for projects which can return direct economic benefits. Furthermore, we hope that wording can be developed and funding specified that will foster more research on primary productivity and species which have a direct impact on the world food situation.

Senator INOUYE. Thank you very much, Dr. Shleser. The report will be incorporated in my report to the full committee.

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I am becoming convinced that the limitation on species will be counterproductive, and I hope that something can be done to possibly eliminate any sort of limitation whatsoever. I have yet to hear of anyone who was in support of limitation.

I value your testimony this morning. It supports my views on aquaculture.

As you have indicated, your primary concern is aquaculture as it relates to food. I am certain you were here when I asked the professor about the other nonfood—possibly wasteful endeavor on the part of us in the United States, ornamental fishes. Is that something that we should be involved in?

Dr. SHLESER. I believe that it is. It had been mentioned earlier this morning by Congressman Heftel that we have some consideration of balance of payments. And environmentalists throughout the world have been expressing increasing concerns about the degradation of the natural reef environments, where the beautiful reef fish are taken. In fact, this is also of concern in Hawaii, which is reflected in the programs of our department of land and natural resources, as well as conservationists.

The fact is that we do have technology for hormone-induced spawning and larva rearing, which can allow us to not only propagate but also domesticate some of the most beautiful reef fishes available in a fashion that could make them abundantly available to people throughout the United States and the rest of the world without environmental degradation and, in fact, could see a great deal of cash flow into the economy of regions where these kinds of endeavors are likely to take place; and that is Hawaii, probably more than any other State in the United States.

I think on the other side of the food issue is the economic opportunity; and certainly, Hawaii has been looking in the past and must continue to look at the money aspect of aquaculture. And given the amount of space that it takes to grow 100 small fish that may be worth $100 apiece, I think it is an opportunity that we can't afford to miss.

Senator INOUYE. It is big business, I assume?

Dr. SHLESER. Yes.

Senator INOUYE. In terms of dollars, it may be bigger than food.

Dr. SHLESER. I understand it is the largest aquaculture industry in the world—excuse me, the largest fish industry in the world in terms of dollars.

Senator INOUYE. Thank you very much. We will be in touch with your operations as we progress on this measure.

Dr. SHLESER. Thank you very much.

Senator INOUYE. Thank you, sir.

Our next witness is the vice president of Aquatic Farms from Kaneohe, Hawaii, Mr. Charles Greenwald.

Welcome, sir.

STATEMENT OF CHARLES GREENWALD, VICE PRESIDENT, AQUATIC FARMS

Mr. GREENWALD. Good morning.

Senator Inouye, on behalf of Aquatic Farms, I would like to express my thanks for soliciting our testimony in regard to S. 1650, of the National Aquaculture Act. I very much appreciate this oppor-

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tunity both to comment on the proposed legislation and to thank you for your persistent work on behalf of the national aquaculture community.

I am also very pleased that we have the opportunity to hold hearings here in Honolulu.

Prior to examining S. 1650, I would like very briefly to explain my company's involvement in aquaculture in order to make the committee more fully aware of the sources of my biases and also the basis of my knowledge.

Aquatic Farms is a high-technology aquaculture farm located on northern Oahu. We are about 3½ years old as a company. For the first 2 years of our corporate existence, our time was entirely consumed in the day-to-day management of our farming activities. This included the designing, building, and operating of our multicrop aquafarm. After an initial growth period, we were able to devote more energy to consulting activities.

We are now currently rearing on our site freshwater prawns, saltwater shrimp, oysters, carp, and tilapia. We have in the past raised mullet and milkfish. We also have a prawn hatchery onsite, and we are supporting an international consulting effort.

Although we did secure an initial loan from the State of Hawaii and a supply of postlarval prawns, our growth has been mostly determined by the traditional market system. It is from this background that I approach S. 1650.

The proposed legislation is timely, purposeful, and presented in a most effective manner. We will all eagerly follow its progress. We can also take pride in the fact that a member of our State's delegation—you, Senator Inouye, did introduce this legislation.

However, I would like to present some additional thoughts which may reinforce the tone rather than the letter of S. 1650. Perhaps you can catalog these ideas as something that will be looked at in the future.

As you, yourself, have stated, aquaculture production in the world accounts for about 10 percent of seafood consumption. In areas such as Japan, Israel, Eastern Europe, and parts of Asia this is a significant portion of their seafood consumption. However, in the United States, only 3 percent of our seafood consumption is derived from aquaculture production.

The world is becoming increasingly smaller and increasingly more interdependent as we are all daily reminded by the economic jolts to our country's economic system. The proposed national aquaculture plan would be much enhanced if it recognized the vast reservoir of experience and skills in aquaculture overseas. For example, the extremely successful aquaculture programs of Japan, Taiwan, and Israel could be reviewed as models prior to drafting the final version of our American plan. Also, our own substantial U.S. experience gained by private companies involved in aquaculture development—the Peace Corps and, for example, our own State of Hawaii—should be incorporated in the thoughts of our national planners.

As far as a view to the private sector, I approach this from a very biased perspective as both the producer and a taxpayer.

I believe the role of the private sector should be strongly stressed in all areas of aquaculture activity. And that this basic premise should

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be constantly reinforced. Too often, for example, grants and demonstration projects are left entirely to the research community. There is some room for private activity in this regard, especially in the fields of private research contracts, management contracts for facilities, renting of existing ponds, and the like.

Currently and unfortunately, there is often a large gap between the research community and the producers. There is at times often animosity. Perhaps by developing shared facility programs it would provide an interface between the public and private sectors, as well as allowing for immediate production level scale transfers, and probably save us money.

Efforts should also be made to avoid public competition with the private sector. I feel that commercial demonstration facilities should be funded only on a short-term renewable basis. And that seed production facilities should operate to stock the private farmer's ponds only until a commercial alternative is found. At that in time the machinery should exist for a rapid transfer of operations from the public to the private sector.

Senator Yim addressed the fact today that there is oftentimes a shortage of talented people in aquaculture. We have found in both our farming and consulting efforts that we are continually in need of scientific expertise. A crucial element in any aquaculture development plan is the providing of education for tomorrow's producers. This is especially true in Hawaii. It would be advisable in the future that we perhaps look to providing specific legislation sponsoring aquaculture-related education. And, that these education programs, if possible, should include on-the-job training components, as well as incentives to industry to provide onsite training.

It is also advisable, where possible, to strive for a wide political consensus on committees and review panels. Geographic area representation as well as input from the business community should be encouraged. In fact, the current Government practice of denying expense assistance to all but Government bodies biases the direction and composition of committees.

Finally, although it may unfortunately be a political necessity, it is technically advisable to centralize control in one Government body, and I hope this can be done in aquaculture.

These are just a few of my comments for possible future consideration. And, I thank you for your time.

Senator INOUYE. You have suggested that before we set up an aquaculture plan for the United States, we should study the programs of Taiwan, Israel, and Japan. Can you give us some examples of what type of experience would be particularly valuable to the United States in setting up its plan?

Mr. GREENWALD. One thing that immediately comes to mind, deals with financial incentives that I didn't address in my comments. Not in those countries that you specifically mentioned, but in other countries of Northern Europe, any investment expenditures that are made in what is clearly a research and development effort, is deductible at about 125 percent of the cost of the R. & D. effort. This gives considerable economic stimulus to the private sector to do R. & D. work on their own.

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As far as the countries that I mentioned, I think what they try to do in the design of their programs is to give the researchers access to rapid scaleups from the laboratory to production type facilities. Perhaps this will come with our new aquaculture center, but now I believe it is lacking.

Senator INOUYE. You have indicated your support for Senator Yim's suggestion that we have a great pool of talent.

Mr. GREENWALD. Yes.

Senator INOUYE. Which will require special education. What is available at the present time, as far as education is concerned?

Mr. GREENWALD. We do have marine option programs at the University of Hawaii that are providing us with some talented students. But, in general, they receive very good training in the classroom portions, but when they come out to work in our facility, it is oftentimes the beginning of any practical field experience.

Then, of course, we do have continuously passing through all of our facilities instate—such as the Oceanic Institute, Piscard Center, and Hawaii Institute of Marine Biology, Anuenue, Fisheries the University people—who are not full-time employees of those institutions, but were able to pick up knowledge working there.

Senator INOUYE. You have indicated the desirability of having centralized control or some lead agency in charge. Do you think that the coordinating effort on the part of the Joint Subcommittee on Aquaculture may fulfill this role?

Mr. GREENWALD. I think it will, however, sitting from Hawaii and trying to observe, it is rather difficult. I think that it appears that it would be able to fulfill that role. This might also be a goal for the future and does not need to be effected right away.

But, just as we have one department for agriculture and one department for transportation, I feel in the long-run some sort of centralization should be effected in regard to aquaculture.

Senator INOUYE. Can you tell us what sort of business you do at the present time? You have been in it now for 3 years.

Mr. GREENWALD. We have a production facility where we are in the continuous production and sales to the market of Malasian prawns, or, should I say, Hawaiian prawns, and also oysters, some clams and we have commercial crop now of carp and mane shrimp. We have sold to the market place mullet and milkfish. We have a commercial hatchery where we export small post-larval prawns as far as from Hawaii to the Caribbean in one direction and parts of Asia in the other direction.

And, then, we have a consulting effort which currently is working in the Pacific and parts of Asia.

Senator INOUYE. How many people are on the payroll?

Mr. GREENWALD. Approximately 20.

Senator INOUYE. Can you tell us what the gross income is?

Mr. GREENWALD. This year should be around a half a million dollars.

Senator INOUYE. Well, thank you very much and I wish you good fortune in the months to come.

Mr. GREENWALD. Thank you very much. Thank you for your time.

Senator INOUYE. Our next witness is the president and manager of Kilauea Agronomics, Inc., of Kilauea, Hawaii, Mr. Joseph Serrao.

Welcome, Mr. Serrao.

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STATEMENT OF JOSEPH L. SERRAO, PRESIDENT AND MANAGER, KILAUEA AGRONOMICS, INC.

Mr. SERRAO. Thank you.

Mr. Chairman, my name is Joseph L. Serrao. I am the president and manager of Kilauea Agronomics, Inc., a wholly owned subsidiary of C. Brewer & Co., Ltd., located on the island of Kauai. Kilauea Agronomics is a diversified company, mainly engaged in growing, processing, and marketing of Hawaiian prawns and guava puree.

The company currently has 100 acres of ponds under water for prawn culture with plans to increase prawn farming to 300 acres, if we are successful.

Production from expanded acreage of prawn farming at yield maturity will total 900,000 pounds of prawns and 12 million pounds of guava pure from eventual 600 acres of guava orchard. Kilauea Agronomics, Inc., has the potential to employ up to 85 people by 1985, therefore, making a sizable, contribution toward the community of Kilauea on the island of Kauai.

Fresh water prawn farming is a new industry in Hawaii with dynamic growth potential. While considerable progress has been made in hatching and rearing techniques since being first introduced, there is still considerable room for improvement in many problem areas requiring research, and I emphasize research, such as pond stocking densities and stocking schemes in relation to growth rate, size and production; management of algae; overall pond management; prawn nutritional requirements; prawn diseases; genetic stock improvement; management strategies that will increase yields, to name a few. The industry is faced with numerous problems requiring badly needed research in areas with short-term as well as long-term potential for improvement.

At this time I would like to commend you, Senator Dan Inouye, for your introduction of the National Aquaculture Act of 1979. The act seems to mandate the development of a very comprehensive national plan that will step up aquaculture production in the United States which may become an important means of food production for the world of tomorrow. While it is basic knowledge that plans of this sort take a long time to put together before implementation, we ask the committee to include in the act or by what other means, the funds for accelerated research in the problem areas faced by the industry today, especially here in Hawaii, which may be critical to its survival. Badly needed research will help step up the slow growth and low levels of production faced by most in the aquaculture industry today.

Even something similar to the U.S. Extension Service would be of great assistance to the farmer, which could be administered through the State, also deserving much credit for its dedicated work on behalf of aquaculture in the State of Hawaii.

Thank you.

Senator INOUYE. Thank you very much, Mr. Serrao.

You have indicated that a very important aspect of this plan is research. How are you coping with the lack of research at the present time, such as management of algae and prawn diseases? Are you doing your own research?

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Mr. SERRAO. At the present time, from, again, practical experience on the farm, we do have problems with algae. And, at the moment you might say we are conducting our own research in the proper management of the algae, which can be deadly if it becomes too rich. And in turn, would cause death to prawns and so forth. These are areas—algae is an area, along with other areas mentioned that I feel that the university extension—or, the University Tropical Agriculture, could expand on and make available to us more updated information that we could use to make life easier on the farm.

Senator INOUYE. Have you found the extension service at the University of Hawaii helpful in your endeavor?

Mr. SERRAO. The university has helped us a lot, especially more so in the engineering field. But, I think the problem at the moment is that whatever they have done is rather limited to date. They have expended funds in a facility, and I think now what is more needed is funds to accelerate the more every day research that is required by the farmer to make him more successful.

In other words, as an example, you know if you are a beef man, a cattle rancher, you can go to a beef specialist and from the university they can give you all the vital information as to how you can profitably to beef farming, ranching, and so forth.

But, at present, we find that this is not true with the aquaculture world at this time. And, I am sure this is what most of the people are in need of, is real expert help in that area.

Senator INOUYE. I'm certain that one of these days soon you will be able to call the University of Hawaii and they will send you a prawn expert.

Mr. SERRAO. Right. That's what we are looking for.

Senator INOUYE. Thank you very much. You have been extremely helpful, sir.

Mr. SERRAO. Thank you.

Senator INOUYE. Next, we have Dr. Lyndon Burzell and Mr. J. Douglas Kilpatrick III, of Lowe Aquafarm, Inc.

Welcome, sir. Are you Dr. Burzell?

STATEMENT OF DR. LYNDON BURZELL, VICE PRESIDENT, LOWE AQUAFARM, INC.; ACCOMPANIED BY J. DOUGLAS KILPATRICK

Dr. BURZELL. My name is Dr. Lyndon Burzell and I am vice president of Lowe, Inc.

It is my pleasure, Senator, to testify on behalf of Lowe, Inc., in favor of S. 1650, the proposed National Aquaculture Act. We believe this to be a good and necessary bill which merits widespread support and speedy enactment.

The self-evident and laudable goal of this bill is to establish in law the position that aquaculture is a form of commercial activity which is fundamentally in the national interest, and one which is to be officially encouraged and supported.

That a national policy in respect of aquaculture is necessary cannot be disputed. The Federal Government, in many of its more or less fortunate manifestations, affects the aquaculture industry at every stage Laws designed to protect our environment have a tremendous impact on the early economic life of an aquaculture venture; governmental

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fiscal and loan policies strongly affect the availability of capital for new aquaculture investment. Policies with respect to import tariffs for fisheries products affect the nature of the marketplace; decisions relative to fisheries management are also of great consequence to the future of aquaculture. Laws relative to the importation of livestock influence the genetic stocks which are available for us to work with. The FDA and other agencies concerned with public health, and acting with presumably the best of intentions, have a strong impact on the economic lives of aquaculture ventures. The list goes on and on.

The effects of these and other manifestations of governmental power and authority are nonetheless severe in the absence of a clear policy to guide the actions of those responsible. On the contrary, the absence of a favorable policy in positive law amounts to an unfavorable policy in fact.

In my limited experience, it is generally true that governmental officials at the field level go by the book. For those in regulatory agencies, the essence of the book is that unless an activity is specificially sanctioned, the answer is "No." In the absence of a policy statement on aquaculture, we as an industry have had for years to argue our case by analogy to more or less related activities ranging from terrestrial agriculture, commercial fishing, waste water treatment and domestic water supply to others which are perhaps even less appropriate. Imagine, for example, long and serious discussions with a major Federal agency charged with regulating multimillion gallon per day municipal sewage outfalls regarding a permit for the discharge of quite innocuous water from a small prawn farm in amounts about equivalent to the flow from a garden hose. Or equally portentious negotiations with another Federal agency regarding the impacts on commercial navigation of a fresh water intake pipe on a stream with less draft and capacity to support navigation than a bathtub.

Based on these and many other interesting personal experiences, I can tell you that for all practical purposes there is at present a defacto and somewhat negative national policy with respect to aquaculture, and one which I and I hope virtually all present would like to see in effect repealed and replaced by the tremendously supportive and welcome language of the bill under consideration.

We hope that this legislation is only the beginning and that in the near future we will be able to meet with you again to testify in support of a bill which restores many of the provisions for financial and other tangible support which were addressed in the predecessor to this bill which was passed but subsequently vetoed.

The continuous and unfailing support of aquaculture shown by you and the rest of Hawaii's national legislative representatives is deeply appreciated by us in the industry.

Senator INOUYE. Your testimony is especially helpful, and I quite agree with you. As I indicated earlier in the Agriculture Act of 1977 there is a specific provision equating aquaculture. It should be the law of the land, but the bureaucrats there think otherwise, which in effect necessitated the introduction of this measure.

We are hoping that with the passage of this bill, the folks in the Department of Agriculture will at least know how to spell aquaculture and, then, we may get somewhere.

But, as you pointed out very dramatically, there is no national policy at the present time. There is also another basic rule with many of us—

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we hate to change our ways. The introduction of new ideas and new programs oftentimes scare us. We hope to convince them that there is nothing to fear, that it is all in the national interest.

You have been extremely helpful and we hope that as a result of this hearing this measure will be expeditiously handled by the committee, and maybe the end of this year become the law of the land.

Dr. BURZELL. Thank you very much.

Senator INOUYE. Thank you.

Our next witness represents the System Culture Corp. of Honolulu, Taylor Pryor.

STATEMENT OF TAYLOR PRYOR, SYSTEM CULTURE CORP.

Mr. PRYOR. Thank you. I appreciate this opportunity to testify on behalf of S. 1650. The plan that it proposes is long overdue and much needed.

I have been working professionally in the field of aquaculture for 16 years. Some progress has been achieved during that time, but there has always been one question that many of us in the field have had a hard time answering: If the technique of aquatic production is potentially so good, why is the actual U.S. production so small? Now I know the answer: we haven't had the proposed national plan.

In reading through the comprehensive scope of your plan, I realize that it will give us both a foundation and a structure within which the vast spectrum of activities, conditions, studies, and needs can be sensibly defined, placed, coordinated, encouraged, and eventually brought to full frunition and effectiveness.

My enthusiasm for the plan is nonetheless dampened by the critical component which is missing. When the President vetoed the earlier version, the so-called Aquaculture Act of 1978, it was because it contained provisions for funding demonstration projects at the State level as well as loan guarantees and crop insurance to commercial growers. As I recall it, the White House memorandum found these features to be both inflationary and unnecessary.

Speaking as a commercial grower, I would like to comment briefly on that position. I believe that well-funded demonstration projects are essential to encouraging rapid growth of the industry. My partners and I have invested over $4 million in just such a demonstration at Kahuku over the last 4 years. We didn't do this for public or national benefit, but because we needed to fully prove all phases of a plankton/shellfish/seaweed production system in order to answer the questions or criticisms of those who would buy our crop, of the lenders who are needed to expand production, of the State and Federal public health agencies, and for our own internal need to obtain the exact cost per unit needed for further planning and pricing. Now that these questions are behind us, we are able to proceed rapidly and with confidence. This kind of investment was necessary because there was no other precedent to follow in order to achieve economic results in shellfish production in the tropics. Had there been one, we and others could have made our investment in production only and would now be exporting shellfish in large volume to the mainland and overseas. Therefore, I strongly endorse demonstration projects as a sensible and necessary use of public money.

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The other deletion in S. 1650 was the loan guarantee. The White House stated at the time the 1978 act was vetoed, that loan guarantees were not necessary since conventional loans were generally available. Three years ago I, too, thought this was the case, but during that time I have tested the enthusiasm of lending institutions for aquaculture in many ways and can flatly state that loan guarantees are essential. I can add that even a 90-percent guarantee is no assurance that a lender will fund new aquaculture construction. Why?

The reason I get is that my farm, when expanded, is not good collateral. In the first place, it is on leasehold land zoned for aquaculture only. In the second place, lenders say that it is "single purpose" use. They add that if we can't make it work, who can? Certainly not the lender! I respond by saying that there are plenty of big companies ready to pick up the pieces from a small grower (God forbid), and furthermore that if you have a well-designed system of pumps and improvements, it can be used for a dozen crops besides oysters, including scallops, abalone, clams, shrimp, lobster, and even mahimahi. It is at this point that even the most supportive lender must state the final truth: That Government banking regulations are so stiff today that there is almost no room for even a 10-percent risk where there is only single-purpose collateral and obviously no precedent for the operation in question. You can see the Catch-22 here: Since my system is patented, I can't possibly show the banners some other system that is working just like it.

If I might diverge from my prepared remarks here, there is one proposal that I think that I would like to make which could alleviate this dilemma. If a State was allowed to be the applicant for a Federal loan guarantee picking up the 10-percent unguaranteed portion of the loan until the aquaculture project in question is a viable business with a few profitable years behind it, then a lot more entrepreneurs could enter the industry. Once the projects are proven, the commercial banks could pick up the 10-percent paper. Initially, the Federal Government would look at the States to service the loans. If there is a lead agency in the State concerned with aquaculture presumably, there would also be both the interest and the expertise to service the loan responsibly during those initial years.

The point I want to make is that the very newness of this promising industry is its worst handicap, not for commercial or technical reasons, but due in large part to Government regulations that were set up for wholly other purposes but which end up being terribly restrictive on an industry which is new. Aside from financing, I could give you dozens of examples from environmental regulations to the many opposing guidelines for encouraging or discouraging investment as set forth in Internal Revenue Service and SEC regulations. And some of these are also in conflict with the USDA guidelines. The way these are imposed on aquaculture amounts sometimes to the irrational. To burden the industry this way, I think, is to ask a child to take a college entrance exams: If he doesn't pass, then you abandon the child.

Fortunately, the situation is not all black. In fact, I anticipate a large loan with a 90-percent guarantee in the very near future from the USDA. Why the turnaround? First, by simply enduring at Kahuku and selling our crop in Honolulu, weekly since May 1977, we

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have in fact established our own precedent. Second, there has been a major State-sponsored educational effort in Hawaii which has opened the eyes of many to the real commercial merits and strengths of aquaculture.

Finally, when you and your colleagues in the U.S. Senate chose to place such a high priority on the industry as represented by your present plan and as well as the former plan, many others took notice and became in some way supportive. Things are different now. Sixteen years ago aquaculture was an idea that fell on stony ground. Now we find ourselves on the fertile ground of a willing and increasingly informed community. I certainly applaud your efforts, Senator, and am grateful for them.

Senator INOUYE. And I applaud your persistence and perseverance. I have been told that you would like to show us some slides.

Mr. PRYOR. If there is time, Senator, I could run through a few slides, but if we are running behind—this is not to show off the farm, but I would like to try to make a few points in terms of energy and conservation in biomass utilization that are definitely a function of the aquaculture industry.

Senator INOUYE. It's all yours.

While he is setting it up, would you provide us with some examples of the problems that we have had with other agencies you have listed, from environmental restrictions, IRS and SEC? If you could give us a listing of your problems, it might be helpful as we proceed on this bill.

Mr. PRYOR. I would be very pleased to do that.

[Whereupon, the slides were shown.]

Mr. PRYOR. This is an aerial view of the Kahuku seafood plantation. The first point I want to make is that this is a marine farm which is entirely inland. There is no connection between the plantation and the sea. It's set up on land that had no other use—for which there was no other use at the time and no projected use now, other than aquaculture purpose.

We call it the Kahuku Seafood Plantation, although we grow principally oysters, because the same combination of pumps and impoundments can be used for almost any of the crops that have been mentioned by all of the speakers today.

We begin with pumps that draw brackish water up from the limestone in the ground below. This is seawater that has never been considered a global resource. It just sits down there in the limestone, and throughout the tropics you have these miles and miles of plat ancient reef that has this resource. Even the seawater is somewhat high in phosphate and nitrates as it comes up due to the fossil organic coral materials.

We pump the water into quarter-acre, half-acre and 1-acre impoundments in this manner. Now, when the water comes up it looks clean like water in a blue grotto and is almost sterile. It's brackish water. At this point we add fertilizer and innoculate it with plankton and let the tropical sun work on it. Within 2 days, you have a rich brown plankton culture like that [indicating].

This demonstrates a point that I think is very much overlooked in aquaculture, that in all the oceans marine plankton is the basis of all productivity and in aquaculture it can be the basis of feed for all other

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animal crops. It is the perfect energy converter from Sun to something useful.

When you have a 1-acre pond with that kind of rich plankton in it, you might have a billion cells per leader. You harvest by simply picking up a board and letting it float into a flume. Now, you can harvest 50 to 100 percent of your plankton per day. What wheat farmer wouldn't like to be able to say that?

If you harvest a 1-acre reservoir for a year at 50 to 100 percent per day, you will get about 900 tons of phytoplankton if you were to filter it out and weigh it. However, we just let the oysters do the filtering. The phytoplankton is allowed to flow down the flume and, then, is distributed into production trenches, like this, which are packed with the phytoplankton feeders. We densely pack trays in this manner and load them with clams or oysters, and in the future we will add scallops, muscles and small abalone. The shellfish just lie there like pet rocks and feed on the plankton.

Now, 900 tons of plankton will give you about 75 tons of oysters per acre, per year. A ton of oysters is worth about $4,000. So you are looking at about $300,000 of gross revenue per year, per acre just by converting that plankton into something that is saleable.

The seed stock is started in these small trays. And here's a point about tropical agriculture, starting with seeds like this [indicating], it takes 9 months time to have a marketable oyster. In the marine areas of production around the world, it takes 3 to 5 years to get the same crop to market.

People used to criticize aquaculture as potentially having an affluent that would ruin the coastal zone. We found that the effluent is in fast of extreme value. The waste water is high in phosphates and nitrates. We simply pass it through trenches in which we grow seaweed.

The seaweed on the left is an import from the Philippines called Euchevma. Recently a Japanese firm announced that after testing many kinds of raw materials for conversion to ethyl alcohol, this seaweed turned out to be the best for continuous and efficient distillation. In other words, the byproduct of an aquaculture farm can be ethyl alcohol, the other component in gasohol.

This slide shows the dried seaweed being prepared. One mile of trench will give you 90 tons of this seaweed. And as the water moves through that trench, the effluent is being cleaned up. We recycle it by putting it into a serrling pond. At the far end of the pond is a hole in the ground—next at the end of that dike there. The clean water goes back down the well, 60 feet down into the limestone and it will percolate out and find its way back to the initial pump and start through the system again.

Another point I would like to make is we have been advised by the university meteorlogical experts that our farm can be operated on wind power for 60 percent of the year. I would like to add that for the other 40 percent of the year we might run on ethyl alcohol.

This is my last slide. I wanted to mention—I don't know if anybody else notice it, but when your bill was reprinted in the Congressional Record, a misprint referred to Secretary Bergland as the Secretary of Aquaculture. I think that's a great step forward, Senator.

Thank you.

Senator INOUYE. Thank you very much.

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Our next witness is the manager of Hawaii Aquaculture, Amfac Foods, Inc., Mr. Richard Gibson.

STATEMENT OF RICHARD GIBSON, MANAGER, HAWAII AQUACULTURE, AMFAC FOODS, INC.

Mr. GIBSON. Senator Inouye, and staff members of the Senate Committee on Commerce, Science, and Transportation, thank you for the invitation to comment on S. 1650, the National Aquaculture Act of 1979.

As you mentioned, my name is Richard T. Gibson and I am currently manager of Amfac Foods, Inc.'s Hawaii aquaculture.

Senator, before making specific comments on the bill, I would like to express our gratitude and appreciation for your leadership and persistence toward the establishment of a National Aquaculture Policy. As you know, efforts by Congress to establish such a policy on aquaculture date back more than 4 years. During this period, the need for a supportive national policy has emerged and continually strengthened, while specific issues, such as a single lead agency, agency jurisdiction, programmatic emphasis and so on have clouded the main issue of policy and precluded passage of a bill to date. Your introduction of a similar bill last year, which subsequently took the form of H.R. 9370 and was passed by the 95th Congress, paved the way for setlement of all but one of the major issues. It was reportedly because of the single issue of financial assistance that President Carter pocket-vetoed that bill.

However, recognizing the apparent, yet unsubstantiated need for some form of financial assistance, S. 1650 which you introduced this month, excludes the financial assistance provisions, yet calls for a detailed study of the subject and the development of a capital requirement plan.

Thus, Senator Inouye, above all else, an endorsive national aquaculture policy is needed to guide Federal agencies in the allocation of their resources toward advancing aquaculture. It is our sincere hope that the wisdom and leadership that you have demonstrated will result in the passage and enactment of the National Aquaculture Act of 1979.

I would now like to offer some specific comments regarding S. 1650, and these comments generally relate to balancing the needs of commercial aquaculture with Federal programs and maintaining cognizance of the intent of the bill, which, as I understand it, is to stimulate private sector development of aquaculture.

Because of my prior experience in aquaculture planning and development, some of my comments will necessarily go beyond Amfac's specific areas of interest.

Congress' findings are clear, concise, and to the point. Finding 6 correctly states that the responsibility for the development of aquaculture, and I quote, "must rest with the private sector." Findings 7 and 8 go on to point the finger of fault of the current lack of progress in the United States at Federal and local governments. I am sure the same could be said for other industries, but as others have mentioned this morning, Senator, it is particularly devastating for this relatively new industry. Aquaculture is a victim of its own youth. Many laws were passed and regulations promulgated without the recognition that aquaculture would someday emerge and become an unintended victim.

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The requirement of a plan in section 4 is well set forth and, as you know, reflective of the activities which are currently being coordinated by the President's Office of Science and Technology Policy. The content of the plan is also in accordance with the current tenet of taking a species development approach. However, a strong word of caution is in order regarding the apparent "catch 22" nature of a species approach. All too often, a species approach overemphasizes the need for research and underemphasizes the broader needs of aquaculture. Some of the broader needs include.

1. Information in the broad areas of market reporting (including significant foreign production and imports), production technology, processing technology, financial information (including capital and operating requirements and attendant risks), technological advances, site requirements, the status of constraining inputes (such as feed, drugs and seed), and sources of technical assistance. The latter two items, namely site requirements and the constraints of inputs, should probably be added to section 4(b) of the bill.

2. Technical assistance programs are necessary in such areas as disease diagnosis, drug and chemical clearance, farm extension, and training.

3. The removal of legal constraints is certainly one of the problems that we are all interested in. In that regard, S. 1650 adequately addresses this area by calling for a detailed study of the subject and the development of a regulatory constraints plan.

4. And finally, Senator, something that others have mentioned this morning, the elevation of aquaculture to parity with agriculture, particularly as they relate to certain tax benefits, minimum wage exemptions, and regulatory exemption status (with regard to pollution control).

These items must not be underemphasized because, although considerable research is necessary to make many culture systems economically feasible, in the end, it is these aforementioned areas which will contribute to an attractive business climate and will pave the way for commercialization. A balance is therefore essential.

I would like to very briefly expand on a couple of the more important issues relating to business climate.

Drug and chemical clearances for aquaculture. This is a problem that all of the minor animal husbandry industries, such as turkey, duck, and sheep production, as well as aquaculture, face. As you have heard last year from expert testimonies, the clearance of a new drug or chemical for use in animal production is a very expensive and time-consuming effort. Considering aquaculture's relatively small needs, the pharmaceutical and chemical industries cannot economically justify underwriting such clearances. Similarly, the aquaculture industry is not of sufficient magnitude to financially underwrite clearances. They are already spending way too much money conforming to a morass of statutory requirements and paying their own way to national aquaculture plan workshops.

It should be noted that the assistance by one Federal agency toward the compliance of regulations of another Federal agency is really only an interim "bandaid" solution to a much larger problem.

Another area of importance is disease diagnosis. The U.S. Fish and Wildlife Services' Regional Disease Centers have been of tremendous

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assistance over the past 20 years. Though not their principal mandate, these regional centers have, within some rather severe financial limitations, provided valuable assistance in disease diagnosis services to many of the catfish, trout, salmon, and oyster farmers. This type of service should be broadened with specific mandate to assist aquaculturists.

Another area is marketing and distribution. Like fisheries and agriculture, aquaculture needs timely, accurate and reliable reporting of production statistics and sales, including major foreign production and imports. In addition, interim assistance in market promotion programs will be most beneficial. However, in the long run, it is my personal opinion that aquaculture's true sign of maturity will be when the United States value-added seafood industry views aquaculture as a reliable, predictable source of raw seafood products. To this end, other Federal efforts in the areas of technical assistance, demonstration, and removal of needless or overlapping statutory constraints will contribute greatly to the marketing effort in the long run.

Financing. I think the same can be said for financial assistance programs. In reviewing a loan application, traditional lines of credit consider the following items: A demonstrated track record; a reliable market; repayment ability; risk capital, or good faith money; and security, or collateral.

Existing channels of Federal credit can and should make a significant contribution to the expansion of aquaculture through the provision of direct loans, participation loans, and loan guarantees. However, the Federal Government's greatest contribution toward increasing the availability of credit for aquaculture may result from advancements which relate to the first three aforementioned items. Federal programs of commercial pilot demonstration, production improvement, training programs, extension, and technical assistance will contribute enormously to the establishment of a track record for the industry, and to the confidence and the ability to repay the loan. Similarly, market reporting and other assistance in promotion, and other market-related programs, will contribute to the establishment of a reliable market.

In closing, I would like to offer two final comments regarding the implementation of the plan, as prescribed by S. 1650. While the implementation section requires the identification of the implementing agency and an estimation of the time required to accomplish each action, there doesn't appear to be any provisions requiring some objective measure of effectiveness. This is not an easy task and I suspect one of the Federal Government's most perplexing problems today. However, I submit that the principal reason we don't have more measures of effectiveness in the Federal Government today is not so much due to the difficulty of the task, but to the apparent universal reluctance of many Government programs to submit themselves to evalution. Section 4(c) should therefore be amended to require some sort of measure of effectiveness, the actions prescribed.

The last point I would like to make is that, assuming that this bill is enacted, the Federal Government will have a clear mandate to see that all the actions prescribed in this bill are carried out. The Federal Government's most powerful tools are its ability to coordinate and provide technical and financial assistance. That doesn't mean to say that all of the actions must be carried out by employees of the Federal

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Government. The private sector is often in a position to rapidly respond to tasks in a highly cost-effective manner. This would be particularly true for demonstration projects, assessments, and other studies. Section 7 of the bill might emphasize this fact.

Senator Inouye, from the prospective of Hawaii's intense planning and development experiences over the past few years, I am convinced that this bill not only address the issues relevant to Hawaii, but to the Nation as a whole. We need a national aquaculture policy, and a mechanism for the coordination of Federal efforts. Your bill does this very nicely.

Thank you for the opportunity to make these comments.

Senator INOUYE. Thank you very much, Mr. Gibson. You have been extremely helpful. Your suggestion will be carefully considered, and hopefully incorporated in our revised bill.

Thank you very much.

Mr. GIBSON. Thank you.

Senator INOUYE. Next we have a representative of the Hawaii Prawn Producers Association, Mr. J. Douglas Kilpatrick III.

STATEMENT OF J. DOUGLAS KILPATRICK III, ON BEHALF OF THE HAWAII PRAWN PRODUCERS ASSOCIATION

Mr. KILPATRICK. Thank you, Senator.

On behalf of the Hawaii Prawn Producers Association, we would like to state our wholehearted support for the proposed bill, S. 1650. Your submittal speech to the Senate as recorded in the Congressional Record and the language of the bill itself speak to the needs of the aquaculture industry quite clearly, and we concur with the observations and the need for action.

We would like to specifically add and underscore the following:

We, as others have spoken, cannot overemphasize the fact that the Federal Government must play an active role in the financial support of newly emerging aquaculture industry. The Hawaii Prawn Producers Association is an association of small and large businessmen, and it's a universal observation, and perhaps a complain of our group, that because of the initial high risk of aquaculture and the fact that very few people know a lot about aquaculture, the obtaining of financing from conventional, private sources is almost impossible unless obtained on a fully secured basis. Without some Federal programs of loan guarantees, very few aquaculture projects will get financed.

We think that one very important feature of the enactment of S. 1650 would be to call everyone's attention to the fact that it is now OK to support aquaculture. It has been the experience of the members of the prawn industry that although there are various Federal agencies that have programs under which aquaculture could be helped, these agencies resist aiding aquaculture because there has been no national mandate supporting aquaculture per se. There are several programs which exist today, but the people that make the decisions in these agencies have not received the message that aquaculture is all right. We think passage of your bill will call this to everybody's attention.

Lastly, we would like to comment that our own Hawaii Prawn Producers Association is an excellent example of what enlightened policies

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can produce. Our Hawaiian prawn industry as it exists today is a well-defined and a viable industry with great growth potential. This has come about because there has been good coordination, good direction, and most importantly, willing cooperation between all sectors involved in the development of our industry, including large and small business entrepreneurs, Government agencies, elected officials, trade unions, the University of Hawaii, and the media. They have all contributed to the creation of our industry. We emphasize that our industry is living proof that people working together toward a common, well-defined goal can produce desired results.

Everybody else has been speaking about the bill and the attention it will receive, and we wanted to point out on behalf of the industry that there are some success stories, or at least evidence that enlightened enactment can result in similar success stories, not only here in Hawaii but throughout the Nation.

Thank you.

Senator INOUYE. Thank you very much, Mr. Kilpatrick.

How many prawn producers do we have in Hawaii?

Mr. KILPATRICK. We have 16 producers that are members of the association, and another 5, or the balance of the producers are all involved in an associated way.

Senator INOUYE. So, there are 21 producers?

Mr. KILPATRICK. Yes.

Senator INOUYE. What sort of income do these 21 producers represent?

Mr. KILPATRICK. There are two large operations, the Brewer operation on Kauai and the Lowe Aquafarm operation in Kahuku, which are just beginning to come on stream with income. Next year the association could reasonably expect revenues of about $3 million. And, of course, if people go ahead with the expansion plans that are contemplated it is conceivable that the industry could be at $5 or $6 million in the next 3 or 4 years. This does not include the—what I like to term as—the multiple effect where—we have been talking about producer income, but there are people in related businesses such as delivery, transportation, insurance, processing, distribution, it all has a ripple effect, a multiplier effect, and ends up by creating a lot of jobs—it's a good economic situation.

Senator INOUYE. You have pointed out that this is a rather high risk activity and, yet, you have some success stories. Are you suggesting that out of the present 21 organizations that there are some that might not quite make it?

Mr. KILPATRICK. I don't have first-hand knowledge of the finances of all of the members; I was speaking of aquaculture in general when I made that comment. The prawn industry has a background of 10 years of commercial production here in Hawaii, and as the markets are well defined there appears to be a surplus of demand over supply. All of the operations, as far as to my personal knowledge, appear to be well managed in a well run manner, and I think that the outlook for the prawn industry is very, very good.

Senator INOUYE. Thank you very much. You have been most helpful.

Mr. KILPATRICK. Thank you.

Senator INOUYE. We are now pleased to have with us the group vice president of Theo H. Davies & Co., Ltd. of Honolulu, Mr. Francis Morgan.

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STATEMENT OF FRANCIS MORGAN, GROUP VICE PRESIDENT, THEO H. DAVIES & CO., LTD.

Mr. MORGAN. Mr. Chairman, and members of the Senate Commerce Committee.

My name is Francis S. Morgan. I am group vice president for agriculture of Theo H. Davies & Co., and executive officer of Kualoa Ranch.

Davies and Kualoa Ranch appreciate and support the effort and service to Hawaii by the members of the Senate Committee on Commerce, who have developed and introduced the National Aquacultural Act of 1979. Particularly, we want to thank Senator Daniel Inouye for his leadership in this exciting undertaking.

At Davies we believe there is a good potential for aquaculture in Hawaii. Our temperature and sunlight conditions situate us well to capitalize on technology and markets which are rapidly developing. Davies has been, and is continuing to review the potential for aquaculture in Hawaii and to evaluate the possibilities of engaging in this business.

Kualoa Ranch, a private cattle ranch on the windward side of Oahu, has made available sofe of its land to establish an aquculture farm, which is successfully producing Malaysian prawns and oysters. Our initial experience has been good, and we are now considering converting any additional area to aquaculture, which we will operate ourselves.

The National Aquacultural Act of 1979 will assist in research and development, of great importance to any industry, but especially crucial to a fledgling industry such as aquaculture. National attention will be focused on auquacultural problems. Further, we are hopeful that coordination at the Federal level will help to streamline the procedures required to enter into and to work in aquaculture.

I would like to make some recommendations on how I believe, in addition to the excellent act you are proposing, Government could further assist the private sector in advancing aquaculture.

It is important that, once the aquacultural industry has become established, Government take great care not to unfairly compete with industry. It may be necessary for the Government to enter into certain developmental or research projects to stimulate progress. However, it should withdraw from these activities when private industry has progressed to the point where it can efficiently perform these functions. Also, some programs could be contracted out to private industry rather than taking on by Government expansion.

A present need of the aquaculture industry is trained personnel. There is a dual opportunity for Government to assist Hawaii's young people to learn rewarding work and to secure good jobs either here in the State or away, and to assist the industry in its profitable growth.

Although the first priority is to have the proposed National Aquacultural Act approved by Congress and the President, at a later time the economic incentives helpful to a new business should be again reviewed. Such incentives are important if we are to maximize the potential of aquaculture in Hawaii, and this act should be used to identify the particular types of assistance and incentives which are needed.

I appreciate this opportunity to testify before you. Thank you very much.

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Senator INOUYE. Mr. Morgan, thank you very much, especially for your comment that the Government should not compete with the private sector. I thoroughly agree with you. It is a problem that many of us in Congress have been trying to resolve, but we find that once you establish a bureaucracy to handle a program, it is very difficult to terminate that activity. That's why some of us are fostering this so-called sunset law, that agencies must come before us at periodic times to justify their continual existence.

But, I agree with you thoroughly that once you reach the point where the private sector can efficiently perform these functions that are being carried on by the Government, the Government should step aside. It is bad enough that you're having your own competition with other countries. We will keep our eyes on that and be very careful.

We hope that we can put something in the legislation that will bring this about, but I don't think the written law will be sufficient to do that.

As far as the economic incentives, as you have pointed out and as I have pointed out, this measure is devoid of those programs because they were, according to the White House, the cause of the veto. However, I can assure you that those of us who are pursuing this matter, will continue to press for their adoption.

Mr. MORGAN. Thank you.

Senator INOUYE. Thank you very much.

Our final witness today is the manager of Aquatools, a Division of SEACO, Mr. Max Barr.

Mr. Barr, welcome.

STATEMENT OF MAX BARR, MANAGER, AQUATOOLS DIVISION, SEACO

Mr. BARR. Good morning, sir.

Senator INOUYE. I can assure you that although you are the last witness, it doesn't mean that you are the least important.

Mr. BARR. I'll try to keep it the shortest, though.

Senator INOUYE. You have all the time you need.

Mr. BARR. Mr. Chairman, I appreciate the opportunity to be here before the committee the morning. I would like your permission or your consent in deviating from my prepared text, because with the depth of testimony you have had before this committee this morning, the subject of aquaculture has been fairly well covered and the importance of the National Aquaculture Policy Act has been well reviewed.

What I would like to do is narrow in on one area and possibly contribute to the testimony before the committee in an area that hasn't been covered, and that is from the private sector of a commerical firm, while not directly involved in aquaculture, certainly is in direct support of it.

Several years ago, SEACO, an engineering firm in Kailua, recognized the importance of aquaculture and how it was growing in the equipment needs—the engineering problems that have been alluded to this morning. To that end, in conjunction with some of the work that's been done by the University of Hawaii in equipment development, we formed a division called Aquatools. This division was formed specifically for the development, for the fabrication, and for the marketing of equipment specifically designed for aquaculture.

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Historically, up to now, it is my impression the fact that the aquaculture industry has had to use either equipment from another industry, from agriculture, or homemade equipment, equipment that had been redesigend or modified for their needs. Our division has gone into the business of designing, fabricating, and marketing specific equipment to meet the engineering problems of the local Hawaiian prawn farming industry. To this end, our efforts to date have been very, very gratifying.

After approximately 1 year of being in business, an investment of several thousands of dollars, we have working in the field equipment which we think is very satisfactory and several local prawn farmers are using it, and it is helping them increase their production and to be better farmers.

What has been very, very frustrating to us, as to many small businesses, is the inability to find capital to finance these equipment purchases. It is my impression that many of the farmers in their initial plans or initial State loans or grants and otherwsie, have established their farms, but at the time this was done, there was no equipment on the market that they could include in their planning and their budgeting and their purchasing. Now, such equipment is available, and it is certainly available to help the farmers. Then comes the question of capital. And I think I perceive aquaculture right now as being a rather low-margin business. I think some of the harvests have not been what we would like to have seen because of weather conditions. I think there has been a reluctance on many of the financial institutions to support aquaculture, and this has been alluded to in previous testimony.

I think one fine example of a plus in this area though, Senator, has been the efforts of the State of Hawaii, again. The State got a number of bankers and other financial institution representatives together and I think presented them very favorably the picture of aquaculture, with the hopes of furthering loans to the various farmers. And hopefully, this will mean the fact that we will be able to market our equipment, they will be able to harvest their prawns and feed them more effectively.

I think that any action, and I think your bill is a tremendous example, S. 1650 represents a forward step in gaining the recognition, the publicity, or whatever is needed to give aquaculture the same standing as agriculture has now. I think any efforts like this, while this bill does not include the funding which has been alluded to in previous testimony, if it establishes the industry as one of the leading industries, an important industry, then hopefully the capital, the investment capital, the programs can follow on such as loan guarantees and things like this which will provide the industry with the capital, to be able to go out and get the equipment and make the other improvements, and conduct the research to where it can become a very viable and a major contribution to our food supply, drug business, and other related areas.

We have been extremely satisfied with the progress that we have seen, but we think we are at a crunch point and we think we are going to need something to keep the industry going and growing. And, we truthfully think that S. 1650 may provide some of that emphasis.

I appreciate the opportunity to testify this morning.

Senator INOUYE. Thank you very much, Mr. Barr.

Technologically, where would you rate the United States in comparison with the other countries that have been quite advanced in aquaculture?

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Mr. BARR. Senator, I don't have the background to make a good judgment on that. I can only say two things. I think in technology, we are probably ahead. I think we have equipment, with the exception of possibly the Japanese, that is superior to the other countries. However, I think, from my limited experience in the business, that what overcomes this and why we have been so low on production compared to other countries, if we are more technology advanced, is their availability of manpower and cheap labor.

I know in talking to representatives from Malaysia and other places about some of our specific equipment, they don't have the interest that our farmers do in specific equipment, because they say, "Why should I buy this piece of equipment when I've got 20 people with 40 hands that can do the same thing for less money?" So, I can make that observation, but I can't answer your question, sir.

Senator INOUYE. Do you feel sufficiently confident that aquaculture is the thing to come?

Mr. BARR. Yes, sir. If it is given the emphasis, the priority, and the support at all levels of government, starting at the Federal level, I do.

Senator INOUYE. Well, with that is the last word in this hearing. Thank you very much.

Mr. BARR. Thank you, sir.

Senator INOUYE. The hearing will stand in recess, subject to call from the chairman.

[Whereupon, the proceedings ended at 11:30 p.m.]

[The following information was subsequently received for the record:]

STATEMENT OF FRED ROHLFING, DIRECTOR, AMERICAN SAMOA OFFICE—HAWAII, GOVERNMENT OF AMERICAN SAMOA

Senator Inouye, thank you for the opportunity to testify today. My name is Fred Rohlfing, Director of the "American Samoa Office—Hawaii". I appear to support S. 1650 on behalf of the American Samoa Government and specifically the Director of Marine Resources, Henry Sesepasara and Governor Peter T. Coleman. American Samoa is a small territory of the U.S. in size and numbers of people. However, it, along with other Pacific islands, has a definite future in the field of aquaculture. The American Samoa Government is already heavily involved in the development of shrimp, mollies, rabbitfish and mullet. But we need additional technical guidance and financial support. This can only be achieved with the type of federal support that will be engendered by enactment of this bill.

American Samoa needs to develop new sources of revenue and opportunity for its people. Aquaculture fits our needs in an area of limited land space. Moreover, aquaculture is compatible with the Samoan culture and environment. Support for our aquaculture program will also enable American Samoa to further develop its role as a leader in the South Pacific region and will have positive side benefits to our regional market and transshipment center development efforts.

We look forward to working with the State of Hawaii and the federal government in constructive acquaculture development. S. 1650 is an essential step to the realization of positive goals in the aquaculture field.

We join with the State of Hawaii in comments relating to the need for diversity in aquaculture programs within a national general framework. The national plan could well reward those states and regions who develop meaningful cooperative efforts—such as should be developed through the proposed Pacific Islands Regional Commission.

We wish to commend your leadership in this field, Senator, which testifies to your continuing commitment to the best interests of the Pacific Islands generally. The people of American Samoa are grateful for these efforts. Thank you.

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NATIONAL AQUACULTURE ACT OF 1979

WEDNESDAY, NOVEMBER 14, 1979

U.S. SENATE, COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION AND SUBCOMMITTEE ON AGRICULTURAL RESEARCH AND GENERAL LEGISLATION OF THE COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY,
Washington, D.C.

The committees met, pursuant to notice, at 10 a.m., in room 324, Russell Senate Office Building, Hon. Daniel K. Inouye and Hon. Donald W. Stewart, presiding.

Present: Senators Inouye, Stewart, and Warner.

STATEMENT OF HON. DANIEL K. INOUYE, A U.S. SENATOR FROM HAWAII

Senator INOUYE. This morning the Senate Committees on Commerce, Science, and Transportation and Agriculture, Nutrition, and Forestry are convening jointly to receive testimony on two bills, S. 1650 and S. 1408,[1] to provide for the development of aquaculture in the United States.

These two bills are similar to a bill which Congress passed last year, but which was pocket vetoed by the President at the end of the last session. In his veto message, President Carter stated that the main reason for the veto was that last year's bill contained financial incentive programs which would have provided loan guarantees and insurance to the aquaculture industry and that these programs were unnecessary.

In an attempt to meet the objections of the administration, the financial incentive provisions of both of the bills we will be discussing this morning were substantially altered.

S. 1408, while retaining the programs, greatly reduces their funding. S. 1650, which I introduced along with 13 cosponsors, eliminates those programs but requires that a study be undertaken to determine whether new financial incentive programs are needed and, if so, requires that a plan be developed to meet the needs identified. While I am still convinced of the need for these programs, there is an even greater need that the Federal Government establish a long overdue policy recognizing aquaculture's potential to make a tremendous contribution to the world's food supplies, and encouraging the aquaculture industry to develop that potential. This potential and the need for a strong and supportive Federal policy were clearly demonstrated to me last August at field hearings that I chaired in Honolulu. The Hawaii State government has declared aquaculture development to be a major priority, and the enthusiasm of the people involved, and the degree of success

[1] See p. 106 for the text of S. 1408 and p. 153 for the text of S. 1650.

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which they have already achieved, is truly inspiring. With greater encouragement and assistance from the Federal Government, this success can be expanded and repeated elsewhere.

I was, therefore, pleased to learn that the administration is prepared to testify in support of S. 1650. I have also been very encouraged by the administration's efforts in the last year to increase interagency coordination and planning for aquaculture. I am therefore hopeful that the Congress and the administration can now proceed as partners in the enactment and implementation of a strong aquaculture policy.

This morning we will receive testimony from three panels of witnesses. The first will consist of representatives of the White House Office of Science and Technology Policy and the Departments of Agriculture, Commerce, and Interior. The second will consist of representatives of Federal agencies currently offering financial incentives for aquaculture: the Small Business Administration, the Farm Credit Administration, and the Farmers Home Administration. The third panel will consist of representatives of various segments of the aquaculture industry.

Before proceeding and calling the panels, I would like to call upon my distinguished colleague, the Senator from Virginia.

STATEMENT OF HON. JOHN W. WARNER, A U.S. SENATOR FROM VIRGINIA

Senator WARNER. Thank you, Mr. Chairman. I share your beliefs in aquaculture for our Nation. This year America will import 70 percent of its fish and seafood. We will have a balance-of-trade deficit approaching $2.5 billion in fish products alone.

Many of us are seeking ways to help the American fisheries industry improve its productivity. Last month we heard testimony on the Saltonstall-Kennedy Fisheries Development Act, of which I am a cosponsor.

Today we will discuss the National Aquaculture Act of 1979, of which I am a cosponsor. I cosponsored this legislation because I firmly believe that an enhanced aquaculture industry can help our Nation achieve its balance in foreign trade and provide new jobs and create a large new source of good high-protein food for the United States and, indeed, help the entire world.

There is already a great deal of aquaculture activity in my home State of Virginia. About 4 million pounds of oysters are harvested annually; mussels, crabs, and clams are also cultured and harvested. Virginia is one of the leading trout farming States in the Nation. Perhaps 2 million pounds of trout are grown commercially each year.

Because of the biological nature of the fish, many Virginia farmers are able to raise trout in ponds fed by natural springs. These farmers often need technical and financial assistance in order to begin production. The legislation we are discussing today will help to provide this technical assistance. It will result in a much needed identification of various types of financial assistance required.

S. 1650, the National Aquaculture Act of 1979, will not solve all the problems now confronting the industry, but it will bring order to various existing Federal programs and let us better understand the needs of the aquaculture industry. I hope the bill will be the

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beginning of an effective program to further expand the American fish and seafood production.

Senator INOUYE. Thank you very much.

The first panel appearing before this committee consists of Mr. Denis Prager, Office of Science and Technology Policy, Executive Office of the President; Mr. William Hougart, Coordinator, Aquaculture Development, U.S. Department of Agriculture; Mr. Robert Stevens, Aquaculture Coordinator, U.S. Department of the Interior; and Mr. David Wallace, Director, Office of International Fisheries Affairs, National Marine Fisheries Service, U.S. Department of Commerce.

Gentlemen, you are here.

Will Mr. Prager be the lead witness?

STATEMENT OF DENIS PRAGER, OFFICE OF SCIENCE AND TECHNOLOGY POLICY, EXECUTIVE OFFICE OF THE PRESIDENT

Mr. PRAGER. Mr. Chairman, Senator Warner: My name is Denis Prager. I am a scientist in the Office of Science and Technology Policy in the White House.

I am very pleased to have this opportunity to present the views of the Carter administration on S. 1408, the National Aquaculture Organic Act of 1979 and on S. 1650, the National Aquaculture Act of 1979.

Mr. Chairman, as stated in your opening remarks, about a year ago the President withheld approval of H.R. 9370, the National Aquaculture Policy Act of 1978. At that time the President was particularly concerned about offering major new Government subsidies such as demonstration projects, loan guarantees, and insurance programs unless and until a clear need for them was established

Mr. Chairman, one of the bills we are considering this morning, S. 1408, authorizes the same new Government financial assistance programs contained in H.R. 9370, the bill vetoed by the President last year. Although the funds authorized by S. 1408 for these programs are reduced in magnitude, the administration continues to oppose inclusion of such new Government subsidies until their need has been firmly demonstrated. For this reason, the administration must oppose S. 1408.

However, I am most pleased to be able to state the administration's strong support for S. 1650. It is a particular pleasure to be able to support this legislation as it is the result of close collaboration between members of your staffs and representatives of the Executive Office of the President and of the principal agencies in aquaculture.

It is also a particular pleasure because we know of the chairman's interest in aquaculture and its importance in Hawaii.

Administration leadership has been provided by Frank Press in the Office of Science and Technology Policy, who is interested in aquaculture and who has particularly stressed the need for the Executive Office of the President and the agencies to work with Congress in developing legislation that the President could approve.

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In his memorandum of disapproval of H.R. 9370, the President indicated that the administration recognized the importance of aquaculture and anticipated working with the Congress to agree on additional improvements in the Government's aquaculture program.

During the ensuing months, the administration has undertaken a number of steps designed to strengthen Federal aquaculture programs and respond to the congressional interests and concerns expressed in H.R. 9370. These include: clarifying Federal agency responsibilities, enhancing interagency coordination, developing a national aquaculture plan, and conducting studies of financial, legal, and regulatory barriers to enhancing commercial aquaculture in this country.

In addition, we have been working with members of your staffs to fashion a conceptual framework for potential aquaculture legislation that the President could approve.

This framework forms the basis for S. 1650. It includes a strong national policy statement on aquaculture, calls for the development of a national aquaculture plan, provides for studies of the need for further financial assistance programs and of how we can reduce undue regulatory constraints, and requires the development of action plans based on those studies. Further, the bill recognizes the establishment of the Joint Subcommittee on Aquaculture, a proven mechanism for coordinating aquaculture activities among the several Federal agencies with programs and responsibilities in this area. We are pleased, however, that S. 1650 does not provide for some of the questionable financial incentive programs and costly demonstration programs which were the cause of the President's veto last year

Mr. Chairman, with this as background, I would like to comment on specific provisions of the bill before us. I will not go into a great deal of detail here because the gentlemen who are with me on this panel are from the agencies who are responsible for implementation of specific programs and are much more familiar with the details.

Let me start out by talking about Federal agency responsibilities and interagency coordination.

In previous legislation, Congress has felt the necessity to establish a lead agency, either the Department of Agriculture or the Department of Commerce, and establishing it as a lead agency in this area.

S. 1650 takes a different approach to the problem of interagency coordination and agency responsibility. It recognizes the related but distinct missions of the Departments of Agriculture, Commerce, and Interior. It recognizes the important programs of some 10 other Federal agencies, and it recognizes the substantive and institutional difficulties inherent in the designation of a single lead agency responsible for both domestic and international programs of research, development, transfer, assistance, protection, and conservation, involving both commercial and recreational purposes and freshwater and marine species. Therefore, rather than attempting to select a single lead agency for all Federal aquaculture programs, S. 1650 establishes a formal high-level mechanism for assuring

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coordinated planning, implementation, and evaluation of these activities.

The legislation mandates the continued existence under the Federal Coordinating Council for Science, Engineering, and Technology, of the Joint Subcommittee on Aquaculture representing the 13 Government agencies with significant programs, responsibilities, and interests in aquaculture. The joint subcommittee was formally established under the aegis of the Federal Council early this year, by the Chairman of the Federal Coordinating Council, Frank Press. Dr. Press charged the subcommittee with conducting those activities necessary to assure that Federal aquaculture programs are mutually reinforcing and that optimum use is made of the Federal agency resources and capabilities focused on the development of aquaculture in this country.

Since that time, the subcommittee has made considerable progress toward the goal of fostering constructive and productive coordination among the Federal agencies involved in aquaculture. Under the highly capable leadership of Subcommittee Chairman David Wallace of NOAA—who is on this panel and will talk to us later—the members of the JSA have demonstrated their strong commitment to aquaculture and to the goal of strengthening Federal aquaculture programs and their ability to transcend agency boundaries in the common pursuit of that goal.

Not only has the subcommittee proven the feasibility, practicality, and effectiveness of true interagency coordination, it has tackled difficult policy questions, undertaken a number of complex technical tasks, and committed agency funds to support programs and projects of common interest. I think the members of the JSA have acted in the best interests of the Government and the best interests of aquaculture rather that worrying about their agencies' particular boundaries and areas of responsibility.

We believe that this mechanism will continue to achieve the kind of interagency coordination and cooperation desired by the Congress. We are pleased that S. 1650 recognizes the early successes of this subcommittee and shows confidence in its future productivity.

A second component of our strategy to strengthen Federal aquaculture programs is the clarification of specific agency roles in aquaculture. Representatives of the Departments of Agriculture, Commerce, and Interior are currently negotiating a memorandum of understanding defining their departments' primary areas of responsibilities in aquaculture, describing a specific mechanism for reaching agreement on possible areas of overlapping interest, and establishing, within each of the three Departments, the position of Aquaculture Coordinator. Such a memorandum, together with the enhanced interagency coordination provided by the Joint Subcommittee on Aquaculture, should represent a significant step in enhancing Federal aquaculture activities.

Let me move next to a discussion of the national aquaculture plan.

S. 1650 also calls for the development, and formal submission to Congress of a national aquaculture development plan. Recognizing the important contribution to American aquaculture of a broadly supported and widely disseminated national strategy, the Joint

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Subcommittee on Aquaculture has already undertaken a major effort to develop a comprehensive plan to facilitate future Federal aquaculture efforts.

Mr. Wallace will describe to you the details of the open process through which this plan is being developed and the current status of this major effort. Based on my personal observations of this process, and of the dedication of the agency representatives involved, I am very confident that the Congress will find the resulting national plan to be a substantial contribution to the future course of American aquaculture development.

It should be noted also that this activity is being closely coordinated with a parallel USDA effort to develop an aquaculture plan to guide future departmental programs in this area. Bille Hougart will describe this effort in more detail in a few minutes.

As the chairman said in his opening remarks, the main reason the President felt the necessity to veto the aquaculture bill last year was that it contained authority for new financial incentive programs. There was much concern at that time about the potential future size of the financial commitments the legislation might lead to. There was particular concern that a strong case for the need for those financial incentives had not been made.

Over the past several months, representatives of the White House and members of the joint subcommittee, in consultation with congressional staff members, have explored the question of Federal financial assistance for aquaculture.

As you know, it is a complex question. Not everyone agrees on the extent of the need for financial assistance and the effectiveness of current Federal programs. Although the financial risks involved in aquaculture—particularly marine aquaculture—are recognized, there is a range of opinion on the availability of sufficient private capital, the adequacy of current Federal financial assistance, and the need for additional Federal programs.

In order to obtain more definitive information on which to base decisions concerning the nature and magnitude of Federal financial assistance, the Joint Subcommittee on Aquaculture has designed a comprehensive study of this problem and several agencies have contributed funds to support a contract let by the Department of Commerce.

I think again this is an example of the way this subcommittee has been able to act or for various agencies to act or contribute funds to aquaculture.

Following an open solicitation and careful review of the proposals submitted, a contractor has been selected and the project funded. The results of the study, expected to be available within about 16 months, will indicate the degree to which, if any, the growth and development of commercial aquaculture in the United States is being impeded by the lack of sufficient venture capital, disaster loans, and insurance, and the study will allow us to assess the adequacy of current Federal financial assistance to the aquaculture industry. We are pleased that S. 1650 formally recognizes the importance of this study and directs that its results be submitted to Congress.

Further, the bill requires that within 6 months of the completion of the capital requirements study, the administration submit to

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Congress a plan defining those Federal actions, if any, found to be necessary to provide financial assistance beyond that available through normal credit channels and existing Federal programs, and recommending appropriate legislative actions. We feel confident that this research and planning process will, in the end, provide definitive information on availability of financial assistance for the aquaculture industry and produce a strong rationale for decisions concerning future Federal financial assistance programs.

Similarly, we have developed a study of the regulatory constraints on aquaculture. Although each governmental restriction and procedure is instituted for a worthy public purpose—for example, to protect the environment—the resulting permits and approvals, written studies and statements, hearings, complicated forms, and agencies to satisfy, constitute a formidable barrier to the initiation and operation of commercial aquaculture enterprises.

Here again, however, we lack definitive data on the nature, magnitude, and geographical variation of this problem. For this reason, the Joint Subcommittee on Aquaculture has designed a study to identify and catalog relevant State and Federal regulations restricting the growth of commercial aquaculture, conduct case studies of representative marine and freshwater commercial aquaculture operations, and analyze the effects of regulation on the U.S. aquaculture industries. This study is now underway. A contract for this purpose was let by the Department of the Interior on September 28, 1979, again with funding provided by eight Federal agencies.

S. 1650 incorporates this much needed study and calls for the prompt submission of its results to Congress. Further, this legislation mandates the development, by the administration, of an action plan based on the results of the study. This plan is to describe specific steps the Federal Government can take to help alleviate the legal and regulatory barriers to the initiation and operation of commercial aquaculture ventures.

This legislation also authorizes "such sums as may be necessary" for the purpose of this act and authorizes the Secretaries of Agriculture, Commerce, and Interior to use grant and contract mechanisms for carrying out their responsibilities under the National Aquaculture Development Plan. This provision will facilitate the development and conduct of programs of research and development, technical assistance, demonstration, extension education, and training programs and activities necessary and appropriate to facilitate the development of an active, viable U.S. aquaculture industry. We are particularly pleased that this bill limits the scope of the term "demonstration" to include only the construction, operation, and maintenance of developmental aquaculture facilities for testing laboratory results.

Let me conclude, by congratulating these committees for development of legislation which represents a reasoned, rational, and direct approach to achieving its primary purpose: Encouraging aquaculture activities and programs in both the public and private sectors of the economy that will result in increased aquaculture production, the coordination of domestic aquaculture efforts, the

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conservation and enhancement of aquatic resources, the creation of new industries and job opportunities, and other national benefits.

Based on our knowledge of the future potential for aquaculture, and on the existing need for increased biological research and technical development, and on our lack of knowledge of the impacts of financial and regulatory constraints on this country's aquaculture industry, we think this bill represents a sensible and responsible measured step forward.

The administration believes that S. 1650 effectively states strong congressional and executive branch interest in the development of aquaculture in this country, underscores this administration's efforts to facilitate the development of this important industry, and reinforces steps taken to strengthen existing Federal aquaculture programs. For this reason, the administration strongly supports S. 1650.

We look forward to working with the staffs of these committees to clarify and amend language to strengthen this legislation even further.

Senator, I will be pleased to answer any questions which you may wish to pose.

STATEMENT OF HON. DONALD W. STEWART, A U.S. SENATOR FROM ALABAMA

Senator STEWART. Thank you, Mr. Prager, for your testimony here today. And let me say it is my pleasure to join Senator Inouye in welcoming everyone and I apologize for being late. I was asked to preside earlier this morning and I knew we had good people here who could handle the job. Well, they did.

I want to welcome Senator Warner from Virginia. I am glad to have him here with us. I hope he can stay throughout the hearing.

So that we can ask questions, I would ask you gentlemen to summarize your testimony, if possible. I know it is often difficult. We have had some of it ahead of time. I do not know what the other committee members have done, but I have read it. The fact I had it ahead of time and, of course, this committee and the Commerce Committee have been involved in this activity before.

As I am quite sure Senator Inouye commented on, this committee passed, along with the Senate and the House, the National Aquaculture Policy Act of 1978, which was vetoed by the President for reasons which he gave at the time he vetoed it. After that time, a struggle took place among the aquaculture interests attempting to work out a concensus in the spirit of cooperation. That is reflected in Senate bill 1650, although it does not go far enough to address all of the needs and issues raised by those interested in a coherent policy in the area of aquaculture.

I think Senator Inouye and others share with me the view that these bills are positive and represent a first step in meeting those needs.

I am looking forward to hearing from the witnesses today. I am personally specifically interested in some of the financial people's attitudes about what can be done in this particular area. I will not belabor the point but I wanted to make my opening statement. I will ask that the balance of it be made a part of the record, if there is no objection. I would also ask that a letter from our colleague

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Dick Stone who had other business to attend to to be made a part of the record. It is supportive of this hearing and I assume the legislation we are working on. He has a great and abiding interest in this. He comes from the State of Florida.

[The letter from Senator Stone follows:]

NOVEMBER 14, 1979.

MR. DONALD W. STEWART,
Agricultural Research and General Legislation Subcommittee,
Russell Building, Washington, D.C.

DEAR MR. CHAIRMAN: As I will be unable to attend the subcommittee's aquaculture hearing this morning, I did want to express my wholehearted support to you and Senator Dan Inouye for holding this hearing. Aquaculture is a must for increased food production in the future.

Warm personal regards.

Most cordially,

RICHARD (DICK) STONE.

Senator WARNER. Do you want to ask questions of the first witness?

Senator STEWART. If you want to proceed with questions at this time, go ahead.

Senator WARNER. I knew we had to do something in the United States about aquaculture when McDonald's introduced a fishburger. They have to get supplies somewhere. But staff just informed me, for example, that Southeast Asia and China produce 40 percent of their overall fish needs through aquaculture as opposed to the United States just 3 percent. Do those figures comport with your understanding?

Mr. PRAGER. It is a little high.

Senator WARNER. If we do not get underway we will soon be importing aquaculture fish from somewhere else. That is when we give our domestic industry away.

Trout farmers, for example, tell me that loans for trout are classified as specialty loans. As a result, loans to trout farmers carry a higher than usual interest. Instead of being charged at the current already frighteningly high rates, they are required to put a point or two on top. How will this bill help to relieve this problem? Is it a Federal Reserve requirement?

Mr. PRAGER. The bill will not directly solve the problem; however, through the financial constraints study currently underway, a number of these kinds of possible inequities will be studied. Apparently a number of elements of the industry face these same kinds of difficulties. The question is whether or not these can be solved through the private sector, or whether the Federal Government has to get into the act.

When we talked with a number of people last year, there was quite a bit of diversity of opinion about whether or not the Federal Government needs to develop new programs or whether existing programs of financial incentives ought to be torqued up in order to provide the industry with more support.

I think the gentlemen who will testify later from the various agencies will be able to speak to specific questions a little more than I can.

Senator WARNER. Would you, at your earliest opportunity, submit for the record a copy of the proposal for a study of financial incentives?

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Mr. PRAGER. Certainly.

Senator WARNER. You endorsed a provision of the bill which authorizes "such sums as may be necessary" for implementing the act. At some point it will be necessary to specify the specific figures. Can you indicate now what authorization level the administration would accept for the bill?

Mr. PRAGER. No, sir; I cannot.

Senator WARNER. But you will at the earliest opportunity supply us with a ball park figure?

Mr. PRAGER. I really cannot because there have been some increased authorizations in legislation in the regular appropriations in the last couple years. I am not sure how the agencies feel about that.

Senator WARNER. Now, you mentioned the Departments of Agriculture, Commerce, and Interior developing a memorandum of understanding. Can you indicate generally the agreement that will be included in this MOU and when we might expect to see a copy of it?

Mr. PRAGER. The agreements are fairly general, Senator. There have been some verbal agreements, for example, between the Commerce Department and Agriculture stating that the Department of Agriculture is primarily interested in freshwater activities and the Department of Commerce is primarily interested in marine activities. However, there is some desirable overlap. The idea of the memorandum of understanding is to try to provide a mechanism whereby the agencies agree with general divisions of labor and have a specified means of negotiating disputes.

Senator WARNER. I am familiar with that. I have been on your side of the fence for many years.

What about your lead agency?

Mr. PRAGER. We do not think that a lead agency is necessary because of the diversity of the activity. I think trying to give one agency responsibility for this is going to be very difficult. If it is given to the Department of Agriculture, the marine interests will feel left out. If it is given to the Department of Commerce, freshwater interests will feel left out.

Most people feel that interagency committees cannot work; however, in this case, we have an effective interagency committee which reports to the Executive Office of the President because it is part of the Federal Coordinating Council.

The combination of a good interagency committee and a good memorandum of understanding means that we ought to be able to have good leadership and coordination among the agencies and responsible Federal programs without having a single lead agency.

Senator WARNER. I have been a party to many MOU's myself. Do you think it will work?

Mr. PRAGER. Yes; I do.

Senator WARNER. Give it a try.

Senator STEWART. I want to follow up on two questions the Senator asked. You do not even know a ball park figure at all; what you all will be talking about?

Mr. PRAGER. In terms of the total? The only reason I hesitated, Senator, is because we are still developing figures as part of the development of the national plan.

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Senator STEWART. Have you talked about that?

Mr. PRAGER. We did a year ago. We have not talked about specific authorization levels recently because the bill does not talk about specifics.

Senator STEWART. Somewhere down the line you are going to have to discuss or make some kind of commitment. My daddy taught me a long time ago that rhetoric does not amount to much unless you put a little money with it. It would seem to me that you ought to make some kind of commitment, even if it is limited, by the administration.

Mr. PRAGER. I do not think we will have any problem doing that. I do not feel up to doing it now.

Senator STEWART. When would you feel up to doing it?

Mr. PRAGER. A week.

Senator STEWART. Sir?

Mr. PRAGER. A week.

Senator STEWART. We will hold the record open for 1 week and you all can provide that for us.

The other thing that he asked had to do with this joint committee. I understand, based on your testimony, and based on my research of the history of this, the reasons why because of the different agencies involved it would be difficult to have a lead agency. Do you honestly think though that we can cut out the redtape, cut out the bureaucracy, and really focus the country's attention on this problem without having some kind of specific agency response? Do you really think you can do that? Do you think the joint committee effort is best? I am asking you as a newcomer to this particular problem. Or would it be just laying on another layer of bureaucracy?

Mr. PRAGER. I do not think so. I have to go by the experience of this committee which has been highly effective and some of the experience that I have observed in other areas where the lead agency is given responsibility, and areas where there are 13 agencies involved, where we are talking about freshwater, marine, commercial, and recreational, and where the research and development problems span a wide variety of financial incentives. It is a very broad area.

Our response to that was, in a sense, to elevate it rather than having it in one specific agency, elevate it into the Executive Office of the President which we are loathe to do because the Executive Office has a lot of responsibilities. But this committee, the reason I have been able to provide the kind of leadership that I have is because that committee essentially reports in to Dr. Press and I. Dr. Press has been able to maintain his interest. Now, of course, this could all change. We could have a new science and technology adviser and I could be elsewhere, and Dave Wallace won't be chairman of the committee forever; these things do change. But these things could also change if we had a single lead agency and its administration changed.

Senator STEWART. Does that committee support more than is contained in Senate bill 1650, or is this the consensus of opinion as to what needs to be done for this particular industry at this particular time?

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Mr. PRAGER. In terms of financial incentives, does the committee want to go further in legislation than the bill goes?

Senator STEWART. Right.

Mr. PRAGER. No; I do not think so.

Senator STEWART. This is an adequate program for this industry at this particular time?

Mr. PRAGER. I believe that is the way we feel, with what we know today. The committee has met a number of times and talked about this. Some people feel as though they would like to have higher authorizations for research and development. But I think the agreement is that with what we know today and with the results anticipated from the two studies now ongoing, I think the committee agrees that this is where we ought to be.

Senator STEWART. We are currently involved in studies of regulations and financial need as well as the need for an insurance program. Which of these do you think is the greatest impediment to the development of this industry?

Mr. PRAGER. Well, I guess from my own experience and talking with people from the industry and talking with the agencies, it seems to me about split. A number of people said to me last year when the bill was coming through and people were putting pressure on us one way and another, some people felt financial incentives were not nearly as important as the regulatory experience. There have been some papers written about it by people in the industry, that when they attempt to start a new industry or maintain an industry, they have to go through 28 separate agencies and write environmental impact statements, and the jurisdictional problems of State, local, and Federal jurisdictions.

Mr. STEWART. You mean 13 at the national level?

Mr. PRAGER. I am sorry? I am not sure I understand.

Senator STEWART. There are 13 agencies under this bill left intact, supervision of the industry now; 13 left by the bill.

Mr. PRAGER. Well, the one thing that the committee permits us to do is to bring them—primarily research and development agencies—together with agencies that provide financial incentives and regulatory agencies like FDA and EPA. The kind of feedback we get from the field is they have all kinds of problems with FDA and EPA as well as State and local facilities. We have all those people sitting on the committee together.

Senator STEWART. If I am involved in trying to put a catfish farm together or some marine type activity together at the gulf coast, I do not deal with that committee?

Mr. PRAGER. That is correct.

Senator STEWART. Who do I deal with?

Mr. PRAGER. Well, the problem is you have to deal with not only the Federal agencies but those at the State and local level.

Senator STEWART. What I am saying is you have got a situation, it would appear to me—and I am supportive of the bill—it appears to me that you all have a situation where the agencies understand each other, and there is coordination there. I would assume that you all are working toward providing that same kind of benefit to a person who gets involved in an industry. Is that the thrust of what you are trying to do?

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Mr. PRAGER. Yes, sir. The bill would do that also because it mandates that the various agencies provide information to the industry. Everything that is going on in the Federal agencies and through this joint subcommittee has to get out to the industry.

Senator STEWART. I just want to make sure that his contact with those people who are supposed to be helping him is not limited.

Mr. PRAGER. Contact so far has been very good, particularly with the national office involved in agricultural planning. There have already been two open meetings for the development of that plan; the industry has been quite involved, as have representatives of academia. I think there is no inhibition on our part to have the industry involved as much as possible.

Senator STEWART. If we work out amendatory language to strengthen the bill that will be agreed to by the agencies and by the industry, I would assume we would have the administration's full blessing to offer those amendments either in committee or on the floor?

Mr. PRAGER. I am not sure what kind of amendments you are talking about, sir.

Senator STEWART. Those that would perhaps be agreed to to strengthen the legislation.

Mr. PRAGER. I cannot make that kind of statement unless I know what kinds of amendments.

Senator STEWART. Senator Warner just concerned me when he raised the facts and figures.

Senator WARNER. If I may, Mr. Chairman, essentially what we have here in the bill is a study program. We tend to study things too long and too much. I would hope that we could start some folks in the business and let them teach the Government a little bit about success or failure.

Is there not a way that we can cut this thing down from the 18 months that we have got here?

Mr. PRAGER. I think that would be very difficult. We hope to have interim reports out of these studies. However, our goal here is to obtain definitive information rather than the kind of information that we have been getting back and forth all the time—somebody from one State tells us one thing and somebody from another State tells us another. The industry is not uniform in terms of the need for various kinds of financial incentives.

After the bill was vetoed last year, we got together and decided that the best thing to do was to get an outside group that does not have any axes to grind to conduct the necessary studies and provide the definitive data. We have two very excellent contractors doing these studies, but it does take time. I feel as though if at long last we can get this legislation with the administration and Congress working together, we have some agreement on what needs to be done. And, although it is frustrating to wait another year now—I realize that this has been going through Congress for the last 6 years at least—we will have some definitive data on which the administration can base specific plans.

Senator WARNER. There are a lot of folks, Mr. Chairman, in your area growing a lot of catfish and basically if we could give them a little financial incentive we could increase the number of catfish farmers. We know how to do that now, do we not? I know myself, I

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just took a bulldozer and dug out a pond on my farm that is fed by a spring and it is filled with trout in a year's time. I am doing nothing but throwing in the same feed basically that we feed livestock. I do not know about the complexities. Maybe we are making it too complex.

Mr. PRAGER. Mr. Warner, your example points out the diversity of opinion about the need for aquaculture assistance. The people that I have talked to from the catfish industry have not been supportive of any new Federal financial assistance programs. They feel that existing Federal programs are sufficient.

Senator WARNER. That is a good point. It is well taken.

Mr. PRAGER. What I am getting at is that there are different elements of the industry. Catfish is different from trout and from the other species we talk about in the plan. We cannot just talk about aquaculture. We have to refer to specific species. The industry does not have unanimity as to what they feel is needed. I will feel good if we can get a bill through this year and get the President to sign it and get his backing of it; then we are all going along on the same track. That is very important. That is what I have been working for. I have been trying to work in a sense as a mediator within the administration to get a bill that Congress can pass and that the President can approve. I think that it is very important that we are all walking down the same road.

If the study shows that more and better financial assistance programs are needed, you will know it; the results of that study will be submitted to Congress.

Senator STEWART. I think what Senator Warner is asking is why should we wait 18 months. I think you have answered that in part by saying we will have an interim report. I assume we could act either administratively from the executive agencies involved or through Congress.

Mr. PRAGER. I would like to make just one more comment. We are forgetting that we have a number of financial assistance programs in existence. We have the Small Business Administration, EDA, and other programs in both Commerce and the Department of Agriculture. If it turns out to be true that these agencies have not been sympathetic to aquaculture and that authorizations are not adequate to provide loans or aquaculture insurance, then we ought to work with those existing agencies rather than start brandnew programs and brandnew authorizations and appropriations mechanisms; that is one of the things we are trying to do.

Senator STEWART. I thank you for your testimony. I thank you on behalf of this committee I serve on and I am sure the Commerce Committee.

Bill Hougart, do you want to testify? If you please would you summarize as much as possible? I learn a lot more by asking questions.

Senator WARNER. I share that

Senator STEWART. If you would share with us your thoughts and ideas and then we can ask questions. Mr. Hougart, Robert Stevens, and David Wallace, and then we will ask questions.

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STATEMENT OF BILLE HOUGART, AQUACULTURE COORDINATOR, U.S. DEPARTMENT OF AGRICULTURE

Mr. HOUGART. Thank you, Mr. Chairman. I will summarize my statement, but I would like to ask that it be included in the record in full.[1]

Senator STEWART. We will include all of your statements in the record.

Mr. HOUGART. Thank you.

I am pleased to be here this morning to discuss S. 1650. The proposed National Aquaculture Act of 1979, and S. 1408, the proposed National Aquaculture Organic Act of 1979.

Mr. Chairman and Senator Warner, the Department of Agriculture strongly supports S. 1650. The Department is opposed to S. 1408 because it contains questionable provisions as discussed and brought out very clearly by Dr. Prager.

S. 1650 recognizes the progress that we have made in aquaculture at the Federal level and, in our opinion, the effectiveness and feasibility of coordinating aquaculture matters through the Joint Subcommittee on Aquaculture are demonstrated. The committee has already done much to produce a plan for aquaculture. As you know, this is an enormous task.

I am pleased to note, however, that the first draft of the plan should be available within the near future.

We are satisfied with the progress we have made and, as you know, Mr. Chairman, the Department of Agriculture has historically provided services to fish farmers as well as those involved in other farming enterprises.

The Department's interest is further established by the Food and Agriculture Act of 1977. I have an attachment to my testimony, Mr. Chairman, which describes in greater detail some of the specific activities of the Department. I would ask that the attachment also be included in the record.[2]

Senator STEWART. Without objection, that will be included as part of the record.

Mr. HOUGART. Since 1976, the Department has increased its emphasis on aquaculture and given it a higher profile in the Department. An Aquaculture Coordinator has been hired to have a USDA interagency aquaculture work group and proposed personnel for the USDA agency.

This work group has been active since its inception to make the Department responsive and more involved with the aquaculture industry. As Dr. Prager mentioned, they are apparently in the process of developing an aquaculture plan for USDA.

As part of this effort, the Department recently convened an aquaculture work shop at which key representatives from the aquaculture community provided input to our planning process. And, Mr. Chairman, we expect to have this plan completed before the end of the year. In fact, a number of staff personnel from both subcommittees have copies of the draft right now.

Mr. Chairman, the Department is committed to aquaculture. We believe that our aquaculture effort is well-coordinated with other

[1] See p. 88 for the prepared statement of Mr. Hougart.
[2] See p. 89.

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Federal aquaculture activities. We are constantly exploring ways to increase and improve our services to the aquaculture community.

It is the policy of the Department to undertake those technology transfer assistance programs necessary and appropriate to facilitate the development of an act for the U.S. aquaculture industry.

S. 1650 would provide a meaningful statement of the importance of aquaculture and strengthen our efforts to support this industry. The Department is pleased to support this legislation.

Mr. Chairman and Senator Warner, I will be happy to answer any questions you might have.

Senator STEWART. Thank you. Let us hear from Mr. Stevens, Aquaculture Coordinator, U.S. Department of the Interior.

STATEMENT OF ROBERT STEVENS, AQUACULTURE COORDINATOR AND CHIEF OF THE DIVISION OF FISHERY ECOLOGY RESEARCH, U.S. DEPARTMENT OF THE INTERIOR

Mr. STEVENS. Thank you, Mr. Chairman. I am mindful of your request to summarize and I will do so.[1] With your indulgence, I will read the first page and a half to set the stage and then make general comments.

I am Aquaculture Coordinator and Chief of the Division of Fishery Ecology Research, and I am pleased to be here today to discuss aquaculture.

As a representative of the Department of the Interior, which houses the largest freshwater and anadromous finfish aquaculture program in this country, I appreciate your interest in the science.

Dr. Prager has presented the overall administration position on these bills. I will elucidate the important role that the Fish and Wildlife Service performs in the advancement of commercial aquaculture.

A sound technological base is the foundation of a successful aquaculture program. Knowledge of fishery biology and culture techniques gained from appropriate research activities will help reduce costs, unlock opportunities for the culture of heretofore untried species, and generally provide greater assurance of economic profit and product quality.

The National Research Council's 1978 report on aquaculture in the United States identified the priority areas of long-term aquaculture research as nutrition and feed technology, genetics, reproduction, health management, and production systems. The industry will also be restricted without a timely system of drug clearance, a working knowledge of the environmental effects of aquaculture, and the opportunity to consider non-U.S. species as candidates for production. In all of these aspects, the Fish and Wildlife Service is supportive of private aquacultural enterprise.

The Service operates nine laboratories engaged in aquaculture research, including a fish nutrition lab, two disease laboratories, two warm water fish farming experimental stations, a fish genetics laboratory, an exotic species facility, a fish control lab which conducts research necessary for drug clearance, a cool water species research and development lab, and an extensive network of fish hatcheries. I have attached to my testimony a list of Fish and

[1] See p. 93 for the prepared statement of Mr. Stevens.

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Wildlife Service laboratories engaged in aquaculture research and a map showing the locations of our fish hatcheries.

In 1979, we spent approximately $25 million in various aquaculture activities, $5.7 million of which was used for fishery research.

Mr. Chairman, the Fish and Wildlife Service practices aquaculture every day on a nationwide basis and has, in some locations, done so for more than 80 years.

We are interested in the technical and research development aspects of aquaculture and we think we are imminently qualified to continue the role we have been playing and in fact increase it. We feel, for instance, that our fish farm experimental laboratory in Arkansas, through its research and extension service, in essence created the catfish industry which is now operating to the tune of about $100 million per year.

Senator Warner, the fish food you feed your trout was originally developed at our Tunison Laboratory at Cortland, N.Y., which was established almost 50 years ago and that dry food concept revolutionized finfish aquaculture in the United States and the world.

We think we have a unique role to play, a role which will not conflict with any of the other agencies involved in this arena. We certainly support the concept of the bill and we look forward to working in concert with other agencies and Congress in this most important matter.

Senator STEWART. The next witness is Mr. David Wallace, Director, Office of International Fisheries Affairs, National Marine Fisheries Service, U.S. Department of Commerce.

STATEMENT OF DAVID WALLACE, DIRECTOR, OFFICE OF INTERNATIONAL FISHERIES AFFAIRS, NATIONAL MARINE FISHERIES SERVICE, U.S. DEPARTMENT OF COMMERCE

Mr. WALLACE. Thank you, Mr. Chairman.[1]

I am here today not only representing the Department of Commerce but also speaking in my capacity as chairman of the Joint Subcommittee on Aquaculture. And I will confine most of my remarks to the activities which have been performed by this subcommittee.

Mr. Chairman, I would like to point out that I have with me Dr. Tapan Banerjee, who is the Aquaculture Coordinator for NOAA.

I will comment only on three points because I believe most of the discussions that have been held have centered around the critical areas involved in the legislation.

I would like to tell you just a few things about the subcommittee. We have been working on three major activities, as indicated earlier.

Six months ago we started to develop a truly national aquaculture plan. NOAA, about 3 years ago, prepared a marine aquaculture plan. The Department of Agriculture is working on and has just about completed an aquaculture plan for their agency. And our effort, broadly, is to have a national plan which will cover all aspects of aquaculture.

We believe that this work has progressed well. We had a special meeting at which we had 400 people from all over the country giving us their ideas of what would be incorporated in that plan.

[1] See p. 97 for the prepared statement of Mr. Wallace.

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This report is in the final stages of preparation and we would hope to have the first draft in the hands of this committee very shortly.

We are quite certain that we will do that.

Senator STEWART. Let me—would you yield at this point? You all would not be upset if some of those plans and proposals you presented, if we could possibly implement in the beginning of the next session? You all would not be upset if we did that, would you?

Mr. WALLACE. That is what we think it is all about.

Senator STEWART. You all would not want us to wait a full 18 months until you all got it all bound and tied.

Mr. WALLACE. As a matter of fact, Mr. Chairman, we would hope that the aquaculture plan is a dynamic type of thing.

Senator STEWART. That makes me feel better about one of my initial questions.

Mr. WALLACE. Because otherwise it becomes static and destroys the initiative and opportunity to develop. We are looking at this as a first cut. It gives you an opportunity to look at it and see how you can put this into effect. It gives the administration an opportunity to see what steps they could take to pin this thing down. You know, it is get the show on the road.

Senator STEWART. That is an excellent idea.

Mr. WALLACE. I am making a commitment now that we will have this draft to you.

Senator STEWART. Mr. Prager, is that all right with you all in the administration?

Mr. WALLACE. I have not asked Mr. Prager that, but I guess I should have.

Senator STEWART. I was going to ask him that.

Mr. WALLACE. I think it is time to move. And I believe that our committee jointly has done an excellent job.

Senator STEWART. I will mark this as an historic occasion. We had a hearing and asked a question, and got an answer. I think you ought to all stand up and take a 7-minute break on that.

Mr. PRAGER. Stop while we are ahead.

Senator STEWART. Stop the hearing and let everybody submit their statements.

Mr. WALLACE. Mr. Chairman, this is what I get by not staying with my script.

Senator STEWART. Well, I did not stay with mine when I started out. Is that not an amazing thing? I have never been more surprised in my life. When I came up here and went on the hearing trail, talking to people about what their interests were. And I got up here, and I do not mean any reflection on the staff. I could not do without them. But I found out that I did not know a thing. But they prepared statements for me, whether I am at home or here, I always have a prepared text. I think one day they are going to hand me something before I go home and tell me what to say to my wife and children: Tell your wife hello; tell your daughter hello.

Senator WARNER. I can beat that story. When I was Secretary of the Navy one time I was giving a speech. I got a prepared text and when I got halfway through it the page was blank. It said, "You're on your own ole boy."

It is a true story. The fellow who was the draftee finished his term and shoved off.

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Senator STEWART. I will not ask you how well the speech went from there.

Mr. WALLACE. May I say a few more words? One was the question of this 18 months issue. I think it is important to address it. I think I have already indicated that we are ready to do things now, and that is what this first draft of the aquaculture plan is about. But there are some things that really must be given, we think, very careful consideration. Those are the two that Dr. Prager mentioned earlier. One is the capital requirement. This is a very important issue. It affects a lot of people. We want to see that this is done correctly and properly. And I think as a result of this study, we are going to be in a position sometime next year, not a long time, to come to the Congress and say, "Here is what the facts are, and here is what we think needs to be done."

I think that is the rational approach to the problem.

The other one is the question of the legal restraints against development of the industry. I used to be in the oyster business myself. In fact, I was a lessee in the State of Virginia, in Senator Warner's State. And in an effort to try to get my leases and to carry out these things, there were all kinds of political and legal problems—zoning requirements, all these kinds of things that tend to mitigate against movement ahead.

We think we need to get in touch with this, understand it, and lay out a program to simplify these procedures. Some industry people tell me that they have to go through 20 permits.

Senator STEWART. Let us hasten to say, and I am quite sure it is true in Virginia as well as it is in Alabama, that that involves more than the Federal Government. We have folks at the local level in Alabama always asking for the Federal Government to get out of things, but the State and local people are involved.

Mr. WALLACE. I completely agree with you, sir, and that is just what our study is addressing. We are looking at it not only from the Federal standpoint, duplication of requirements, but what the States and the local zoning boards do. It gets down to the very closest thing to the Government in the local business.

We believe we must look at this and it will take some time to do that. Now, we are not going to be able to do this for the whole United States at this time. We are faced with some specific areas and concentrating on those as examples of the kinds of problems we face. And, hopefully, we can come in and say these are the kinds of things that must be addressed, in order to help us solve those problems.

Now, we believe with these two things, and with the national plan as sort of a guideline which is constantly being updated, we are going to be able to move ahead in carrying out a viable aquaculture program in the United States.

Mr. Chairman, I am not going to be in this very long. I am just the chairman of this subcommittee and that does not last. But I have had a great experience in the last year or so as chairman of this subcommittee, because I have seen agencies that are pretty turf conscious push that in the background in order to try to do a job. I think they are going to do it. They have demonstrated that they can. I think this is a very strong endorsement of the potential for the kind of positions involved in this legislation.

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Senator STEWART. Thank you. I have three questions I would like to ask, one first to Bille Hougart. One of the principal constraints facing catfish and trout farmers at this time seems to be the lack of market information and news. I am sure similar information shortages affect shellfish and marine sectors as well.

My particular question is in reference to the first two. Our committee, the Agriculture Committee, has visited the Secretary of Agriculture and asked that market and statistical information be compiled and distributed to the interested parties in the industry.

The Secretary has voiced some support and understanding although we have not seen anything definitive yet. Would you advise me what the Department of Agriculture is doing in the information area? I would also be interested in knowing how the three Departments are cooperating in information gathering and dissemination.

Mr. HOUGART. Mr. Chairman, we are keenly aware of the need for adequate, reliable, and timely aquaculture statistics, but not just for the catfish industry.

As part of our USDA plan, we have components to do just that kind of work, to generate, semiannually, adequate statistics for the industry. This is in our plan. At the same time, within a matter of weeks, we will be providing services to the catfish processing industry by taking responsibility for producing a catfish processor's report on a monthly basis.

Senator STEWART. Let me see if I understand you. You are saying that in answer to the question the committee asked you, was this information being supplied within the next 2 or 3 weeks? Is that correct?

Mr. HOUGART. Well, I believe what I said, sir, was that within the next several weeks we will have made a determination about producing processed catfish reports on a monthly basis.

Senator STEWART. Who will be doing that?

Mr. HOUGART. The Department of Agriculture.

Senator STEWART. Who in the Department of Agriculture will be handling it?

Mr. HOUGART. Most likely it will be the Economics, Statistics, and Cooperatives Service.

Senator STEWART. And Secretary Bergland through you will give us some kind of information, further information about that? Will you provide that for us? Can you make that available?

Mr. HOUGART. I will be pleased to. On the second point, again in our plan, we have intention to provide and test market news services for the aquaculture industry.

As I said in the beginning, we are keenly aware of the need for accurate statistics and an aquaculture crop reporting service in the Department. We will attempt to provide that for the industry.

Senator STEWART. Now, are you going to do it or are you attempting to do it?

Mr. HOUGART. We have done considerable planning already, Mr. Chairman.

Senator STEWART. When do you plan to do that?

Mr. HOUGART. The decision about whether or not to do it will likely come as part of the normal budgetary process for 1981.

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Senator STEWART. In other words, you would not do it for 1981. You would tell us you had geared up to do it, but you could not do it until 1981 because of lack of budgetary capability to do it?

Mr. HOUGART. We support the President's budget, and within those guidelines we review items on a priority basis and we are reviewing this issue currently.

Senator STEWART. Mr. Prager, let us get back to you on this question. Since there seems to be some budgetary constraint, you talked about money earlier; this is something that has been requested by the Agriculture Committee that is needed by the industry. Is there some problem with the administration providing the necessary resources or asking for the necessary resources to meet this particular need?

Mr. PRAGER. I believe that what Mr. Hougart was saying is there is a request for additional funds in the 1981 budget request which is just now being processed. And I do not know the status of that particular request.

Senator STEWART. Well, am I safe to say we will have to wait until 1981 before we do this; or am I just misreading your answer to my question?

Mr. PRAGER. I do not know. Bille will have to comment on what can be done now with current budget authority.

Mr. HOUGART. Mr. Chairman, a base survey for the industry is a part of the USDA aquaculture plan. The primary components may not be implemented until fiscal year 1981. However, in the meantime, we have had sessions with industry to develop the kinds of information that they would like to see us report on. We are working very hard, and have been over the last 4 or 5 months, to determine if we can do it within the current resources available to us this year. We may not.

At the same time, in response to your other question: what are we doing with the other agencies? We have had several meetings on this issue.

Senator STEWART. I do not want to put you on the spot at all. I would just like for you to ask Secretary Bergland and let the committee know what you all plan to do, and what your needs are. And, Mr. Prager, I would like for you to let us know what the administration's views are.

Mr. WALLACE. Mr. Chairman, may I make a comment also?

Senator STEWART. I would like to hear you.

Mr. WALLACE. I think it is perfectly obvious that this matter of statistics is a critical one as far as our agency is concerned. We have met with industry people and they have emphasized this concern. And the need is just as great, I think, in the marine area.

Senator STEWART. I was about to get to that. That is all right. I am glad you offered that. I think our request, if I am not mistaken, was limited to the catfish industry. That is the only reason I asked that question in that context.

Mr. WALLACE. We have already been having some discussions with the Department of Agriculture so that any statistical program that we carry out will be compatible and not competitive or duplicative of what they are doing. We feel it is a key kind of activity. We do not have much money.

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Senator STEWART. That answers my question with regard to the second part of it. I am going to explore that further as we move along.

Senator Pryor of Arkansas is very interested in the status. This would be directed to Mr. Stevens, that status of the Interior Department's aquaculture facility in Stuttgart. Could you tell us what the current status of Stuttgart or its facility, what its future is, how it is being incorporated into the national aquaculture effort?

Mr. STEVENS. Well, we feel we are at a critical mass below which we will probably have to close the lab. We need a lot more funding to do the job we think we should do there. As a matter of fact, $157,000 of the approximately $350,000 used to operate the lab is provided through NOAA. And we really do not feel that this is adequate in relation to present day inflationary trends.

But we do have a good cadre of scientists down there, and they are continuing their research on fish nutrition, particularly catfish nutrition. They are experimenting with genetic strains, the effects of cleaning up the waste water so that it can be reused because the water tables are dropping all over the Southeast and people are not going to be able to use water as freely as they have in the past. We would hope that we could find additional money to increase research in aquaculture.

Senator STEWART. Thank you very much. Senator Warner?

Senator WARNER. Mr. Chairman, since this seems to be a considerable success abroad, to what extent have we studied and tried to learn from others elsewhere in the international field?

Mr. WALLACE. Well, we have many things. About a year ago I had the opportunity personally to go with a group from the National Academy of Science to China to look at the very thing you asked about earlier, and that is this question of what the Chinese are doing with aquaculture.

They probably produce more fishery products from aquaculture than any country in the world. In fact, over the next year we will have scientists from China here in the United States advising with us and some of our people will be going to China to look at aquaculture there.

One of the activities of our subcommittee was we started a translation service in which we pick up foreign publications on aquaculture and translate them. It is a small type of thing, but it can be quite important as we learn new ways of doing things.

Senator WARNER. What is taking place down at the State level? Does each State have a little entity that is focusing on aquaculture?

Mr. WALLACE. Just about every State. The State of Virginia has an active Commission of Fisheries. And the State of Hawaii, for example, has a major program and they have developed an aquaculture plan. The State of South Carolina has an aggressive program.

Mississippi, for example, is a leader in this. There are lots of activities that are going on. We seem to be having sort of a revival in aquaculture, and I think, to a large extent, it may be stimulated by the interest of Congress.

Senator WARNER. Does this bill help encourage the States in their own efforts?

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Mr. WALLACE. I think it helps encourage the States and it gives new encouragement to the industry, if nothing else.

Senator WARNER. The Agriculture Department has developed its plan as to how to implement its responsibilities. Has the Department of Commerce likewise undertaken a plan?

Mr. WALLACE. Yes; we prepared a plan a couple of years ago. I will be happy to make a copy available to you, Senator.

Senator WARNER. What do you envision as the Commerce role under the MOU that we are talking about?

Mr. WALLACE. Well, obviously, it is primarily marine and in the estuarine area. Things like oyster culture or clam culture or shellfish crustaceans would be of interest to us.

We are interested in the culture of salmon, for example, out on the west coast in the Puget Sound. We are doing studies on the culture of salmon and this is already being translated into industry action. There are all kinds of potentials for us, which I have outlined.

Senator WARNER. Mr. Chairman, we have a procedure in the Armed Services Committee whereby we receive of the witnesses from the Government their viewpoints with respect to their official agencies' positions. And then we ask the witnesses their own personal views. What is your personal view about the Government's activity in trying to help financially?

Mr. WALLACE. Well, I guess I will have to draw on my own experiences. I was in the oyster culture business and I had no subsidies or anything else in carrying on that business.

Senator STEWART. So you came up here to work on that.

Mr. WALLACE. I think there are needs for financial assistance. I am speaking on a personal basis.

Senator WARNER. We understand it is personal. We are going to protect you from your boss. You tell us what you think ought to be done here.

Mr. WALLACE. Senator, I am too old to be worrying about that. [Laughter.]

But, as you know, there is no panacea to aquaculture. There is no question at all in my mind. There are some very successful people in aquaculture today who have had not one cent from the Federal Government, and would not want it. I know this. And then there are other people who are doing some really interesting, fascinating things and trying to do it with very limited resources. Some have good ideas and it seems to me these people are worthy of getting some financial assistance, which might be the difference between success or failure.

Senator WARNER. Are we doing enough to stimulate the family entity as a business? We are not trying to develop a Manhattan project or space program here. I would like to see more and more families get into this. Is there an area there that we can be helpful?

Mr. WALLACE. Well, aquaculture, except for a relatively limited number of groups, is small business. Certainly in the marine area, oyster culture was started by little people—a man and his son doing their work together and marketing their product, packaging it, and maybe two or three people helping them. So it really is a small business. A lot of the farms are very small.

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Senator WARNER. We are aware of that. Are we doing enough to encourage aquaculture at the level of the family farm unit?

Mr. WALLACE. I think you can always say no, we are not doing enough. I do not know just how far one needs to go in relation to this kind of thing. You have to be rather careful. In the past there have been great promotion schemes for aquaculture. One of the worst things that ever happened to the oyster business about 25 or 30 years ago was a massive promotion to start really large oyster farms. Many people were persuaded to invest substantial life's savings in this kind of thing and they lost it all. I hope we do not encourage more of that

Senator WARNER. What about the other witnesses, any personal views on this thing as to what we should be doing or not doing?

Mr. HOUGART. Mr. Warner, with respect to the family farm, we can do more. There are opportunities to do more.

Senator WARNER. Well, what would you put in this bill to encourage more participation by the family farmer?

Mr. HOUGART. In my opinion, it does not belong in the bill. We can do it administratively in Agriculture and the various agencies.

Mr. STEVENS. I was engaged between 1970 and 1975 in commercial aquaculture in the State of Florida. We were funded by public subscription and we failed primarily because of the oil crunch. I have no opinion on what the effect of Government subsidies or loans would have had on our operation at the time.

Senator WARNER. Why did you fail?

Mr. STEVENS. We were pumping water 30 or 40 feet up in the air with diesel engines, and the oil crunch made that economically unfeasible; that and a lack of capital. We were trying to do too much on a nationwide basis on too many species without really testing the concept, and we just got overextended. But as far as encouraging family operations, I think a strong incentive there, and I am not going to speak about funding, is extension. I know in our Stuttgart, Ark., lab we have several extension agents who work fulltime with families and family-farm-type operations helping them to get into the catfish industry. And the same thing could apply if we also had trout extension agents. There are a lot of mom-and-pop-type operations in trout culture.

Senator WARNER. Do I judge then that the family situation is reasonably well taken care of, and what we are endeavoring to do here is to go into more of an industrial phase of it?

Mr. STEVENS. I would say they would both benefit from these actions.

Mr. WALLACE. I have to second that. I do not think this is only going to help the industrial operations. I think we have to look to the smaller operations, and I think there is great potential there.

Senator STEWART. In the new species that Dr. Prager mentioned a minute ago, the successful industries are the ones that started many years ago, rainbow trout, or two decades ago, such as catfish and in all of these we had not worked out the principal, practical protocol for successful operation.

There are other new species, such as freshwater prawn and several marine species which an industry or even especially a family just cannot get into it. They do not have the capital to do the experimentation that is needed. I think that is where the

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Federal Service can be most helpful in creating a new industry based on new species. The research and development needed and possibly into the loan guarantees and so forth to help people get a leg up in this and after that they are off and running.

Senator STEWART. Gentlemen, I thank you for your testimony here today. I do not want to cut you off, Senator Warner, but we have another panel and one more witness after that. I want to express my deep appreciation to all of you for coming here and sharing this information with us, and the work that you have been doing already.

[Subsequent to the hearing of Nov. 14, 1979, several questions were submitted to Messrs. Prager, Wallace, and Stevens by Senator Inouye. The questions and answers thereto follow:]

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY POLICY,
Washington, D.C., December 28, 1979.

Hon. DANIEL K. INOUYE,
Chairman, Merchant Marine and Tourism Subcommittee, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Thank you for your letter of December 3, 1979 transmitting several questions in follow-up to my November 14 testimony in support of S. 1650. I apologize for the apparent delay in this response; however, your letter was not received in this Office until December 14.

Enclosed are our responses to the questions you posed. I look forward to continuing to work with you and your staff toward the passage by Congress of aquaculture legislation which the President can approve.

DENIS J. PRAGER, *Senior Staff.*

Enclosure.

FOLLOWUP QUESTIONS TO NOVEMBER 14 TESTIMONY ON S. 1650 AND S. 1408

Question 1. "You said that the Administration opposes the creation of new financial incentive programs until their need has been firmly demonstrated and, you refer to a study which has been undertaken to determine that need. Can we conclude from your statement that if the study concludes that new financial incentive programs are needed, the Administration will support the creation of those programs?"

Answer. The results of the financial constraints study, currently underway, are expected to indicate the degree to which, if any, the growth and development of commercial aquaculture in the United States is being impeded by a lack of sufficient venture capital, disaster loans, and insurance, and to allow us to assess the adequacy of current Federal financial assistance programs. Following the receipt by the Joint Subcommittee on Aquaculture of the findings of this study, the Administration will formulate a plan defining those Federal actions, if any, which we believe are necessary to provide financial assistance beyond that available through normal credit channels and existing Federal programs. If the study determines that Federal financial assistance programs are inadequate to meet the needs of the aquaculture industry, our first priority will be to consider strengthening existing programs. The Administration will only support the creation of new financial incentive programs—with their new legislative authorities, need for separate appropriations, and new administrative structures—if it is determined that the required financial assistance could not be provided via existing programs.

Question 2. "In your discussion of the Joint Subcommittee on Aquaculture, you stated that the JSA has 'tackled difficult policy questions.' Please elaborate on what questions you are referring to and how they have been resolved by the JSA."

Answer. The Joint Subcommittee on Aquaculture (JSA) has, for several years, been an interagency focus for tackling both policy and scientific questions which cut across the boundaries of the several Federal agencies involved in aquaculture. Since its inception, the Subcommittee has been concerned with the policy question of a lead agency for Federal activities in aquaculture. Congress has grappled with this question and proposed several different solutions in recent legislation. After considerable attention to this problem, the JSA has determined that no one agency can provide leadership across the spectrum of aquaculture activities undertaken by the

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Federal government. The most productive arrangement requires responsibility by each agency for its own aquaculture programs with coordination provided by the JSA and the programs of the three major agencies (Agriculture, Commerce, and Interior) formally related through a Memorandum of Understanding. The JSA has also dealt extensively with the problem of financial constraints on aquaculture. After concluding that insufficient data were available to reach a decision on adequacy of current Federal programs, the Subcommittee undertook to fund a study of this problem. Similarly, the Subcommittee is working with an outside contractor to determine the impact of rules, regulations, and procedures on the initiation and operation of commercial aquaculture ventures. More recently, the JSA has dealt with the question of the need for aquaculture legislation. After determining the kind of legislation the group felt was appropriate, it has worked extensively with staffs of the appropriate House and Senate Committees to develop legislation acceptable to the Administration.

Question 3. "You endorse a provision of the bill which authorizes 'such sums as may be necessary' for implementing the act. At some point it will be necessary to specify specific figures. Can you indicate what authorization level the Administration would accept for this bill?"

Answer. The Administration is not prepared to specify authorization levels for S. 1650. We are currently in the process of developing a National Aquaculture Plan which will, for the first time, provide a framework within which future Federal programs in aquaculture research, development, transfer, and assistance will be carried out. The technical aspects of the report are now being finalized; however, budgetary aspects of the plan are still being developed. For this reason, we feel it inappropriate to suggest specific authorization levels at this time. We can, however, ask the agencies to provide you with estimates of the funding included in the President's 1981 budget for aquaculture so that your Committee can have some sense of the overall program size.

Question 4. "You mentioned that the Departments of Agriculture, Commerce, and the Interior are developing a Memorandum of Understanding with respect to aquaculture. Can you indicate generally the agreements that will be included in this MOU and when it is expected to be concluded? Will the MOU designate a 'lead agency?' "

Answer. The purpose of the proposed Memorandum of Understanding is to increase the effectiveness and productivity of Federal aquaculture efforts by defining the primary areas of responsibility for the three principal Federal departments supporting and conducting aquaculture research, development, transfer, and assistance—the Departments of Agriculture, Commerce, and Interior. The agreement: (1) describes the central focus of the aquaculture activities of each department; (2) establishes a mechanism for reaching consensus on potential areas of overlapping interest; and (3) defines the means through which the agencies will coordinate their efforts. One of the primary purposes of the MOU is to preclude the necessity of designating a "lead agency". Rather, through the MOU and the coordination provided by the Joint Subcommittee on Aquaculture, sufficient interagency coordination, collaboration, and joint planning and implementation of programs of mutual interest are accomplished to assure that Federal aquaculture programs are productive and effective and scarce Federal resources are optimally utilized.

Question 5. "Attached is an amendment to S. 1650 that has been offered by Senator Weicker and an excerpt from his submitted statement which explains that amendment. Please provide the Committees with the administration's views on this amendment."

Answer. The Administration has no objection to the amendment proposed by Mr. Weicker, but questions the desirability of including such a requirement in statute.

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U.S. DEPARTMENT OF COMMERCE,
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,
NATIONAL MARINE FISHERIES SERVICE,
Washington, D.C., December 21, 1979.

Hon. DANIEL K. INOUYE,
Chairman, Subcommittee on Merchant Marine and Tourism, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR SENATOR INOUYE: Enclosed are my responses to the questions you posed in your letter of December 3, 1979. I hope these answers will be helpful in dealing with the proposed aquaculture legislation.

Sincerely yours,

DAVID H. WALLACE,
Chairman, Joint Subcommittee on Aquaculture.

Enclosure.

Question. There has been considerable criticism of the "species-specific" approach taken by the National Aquaculture Plan. Some experts are concerned that, by focusing on certain species, the Plan will make it more difficult for other species, such as mullet or carp, to be developed commercially. How do you respond to this criticism?

Answer. Development of aquaculture ultimately requires the development of systems of culture of individual species. It is therefore not possible to set out a program of encouraging American aquaculture without at some time addressing the specific biological parameters of the species to be raised, and analyzing the other particular needs and constraints facing the farmer who will be engaged in the raising of that species. In developing the National Aquaculture Plan the decision was made, on the advice of most of the industry and others interested, that the species approach should be taken. Otherwise the Plan would not have taken the most useful final step, and at a later time species plans would have had to be prepared. No useful purpose was perceived in delaying this step. At the same time, it has been repeatedly emphasized that because 12 of the more important species have had plans prepared for them there is no intent to exclude attention nor to fail to press for development support for any species for which plans were not prepared in the first draft of the Plan. It has also been repeatedly emphasized that the development of the Plan must be a continuous effort, and that additional species plans will be added as the need arises and time permits. In short, nothing in the Plan will prevent the commercial development of mullet, carp or any other species; on the contrary, if any action is encouraged by the Plan, it will assist those species as well as the ones for which plans have been developed in this first version.

Question. The Department of Agriculture has developed its own "Plan" for how to implement its responsibilities relating to aquaculture. Has the Department of Commerce undertaken a similar effort?

Answer. The Department of Commerce was the first agency to develop its own Plan. The NOAA Aquaculture Plan was issued in May 1977, and the Department has followed it as well as resources available would allow. Predictably, there are many parts of the 1977 Plan which are now outdated, since needs and circumstances change continuously. We are responding to these changes. This flexibility will have to be used with the National Aquaculture Plan as well.

Question. What do you envision to be the Department of Commerce's role under the Memorandum of Understanding which is currently being developed among the Departments of Commerce, Agriculture, and the Interior?

Answer. A copy of the Memorandum of Understanding showing the role proposed for the Department of Commerce is enclosed. The Administrator of NOAA has signed this Memorandum.

Question. Mr. Wallace, you have been familiar with the aquaculture industry for many years, from the perspective of both a shellfish grower and a government proponent of aquaculture. From your personal observations, is the Federal Government currently providing adequate financial incentives for the development of aquaculture?

Answer. Funding for aquaculture development by the Federal Government has been spotty for many years. There has been intermittent activity by various funding agencies, but no really consistent long-term financing program by any of them so far as I can observe. Small aquaculture operators are frequently undercapitalized and thus become marginal in their operations. In such cases, additional sources of financial support through direct loans or loan guarantees would be of substantial help and might be the difference between success of failure. I would like to see the

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Federal Government provide such a mechanism since the current funding procedures have not been adequate or focused to meet the need.

INTERAGENCY AGREEMENT AMONG DEPARTMENT OF AGRICULTURE, DEPARTMENT OF COMMERCE, AND DEPARTMENT OF INTERIOR

Subject: Designation of areas of responsibility in aquaculture.

I. Background

Aquaculture—the propagation and rearing of aquatic species in controlled or selected environments—has important international and domestic ramifications. Internationally, aquaculture represents an important source of food and an industry particularly suited to developing countries. Domestically, aquaculture represents: an economically sound approach to meeting the increasing demand of the American people for seafood; a source of industrial materials, pharmaceuticals, and energy; a biological approach to control of pollution and degradation of human and industrial wastes; and a means of rehabilitation and enhancement of U.S. fish and shellfish resources.

Although aquaculture currently contributes approximately 10 percent of seafood production worldwide, less than 3 percent of current U.S. seafood production results from aquaculture. Thus, domestic aquaculture production has the potential for significant growth. The primary responsibility for attaining this potential rests with the private sector. However, it is the policy of the Federal Government to undertake those research, development, transfer, and assistance programs and activities necessary and appropriate to stimulate the development of an active and viable U.S. aquaculture industry.

A number of Federal agencies have responsibilities and programs related to aquaculture. These range from regulatory responsibilities for chemical agents and environmental protection to programs of financial assistance, research and development, technical assistance, advisory and information services, and education and training. Coordination of these activities is the province of the Joint Subcommittee on Aquaculture, established by the Committee on Food and Renewable Resources and the Committee on Atmosphere and Oceans of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET).

The primary responsibilities, resources, and programs in aquaculture reside in three Departments: Agriculture, Commerce, and Interior. If the Federal government's efforts to stimulate and facilitate the development of aquaculture in this country are to succeed, it is essential that the activities of these three agencies be mutually reinforcing. It is for this reason that representatives of the Departments initiated the negotiations which culminated in this agreement.

II. Purpose

The purpose of the Interagency Agreement is to increase the effectiveness and productivity of Federal aquaculture efforts by defining the primary areas of responsibility for the three principal Federal Departments supporting and conducting aquaculture research, development, transfer, and assistance—the Departments of Agriculture, Commerce, and Interior. The Agreement describes the central focus of the aquaculture activities of each Department, establishes a mechanism for reaching consensus on potential areas of overlapping interests, and defines the means through which the agencies will coordinate their efforts.

III. Areas of responsibility

The Departments of Agriculture, Commerce, and Interior agree that the following paragraphs accurately describe the primary focus of responsibility for aquaculture in each Department.

Department of Agriculture.—The Department of Agriculture is responsible for Federal research and development activities in support of aquaculture for food, recreation, and other personal and agricultural purposes carried out by the private sector on privately owned or leased land and water. This work is predominantly oriented toward aquaculture in fresh water.

Department of Commerce.—The Department of Commerce, through the National Marine Fisheries Service, and Office of Sea Grant, is responsible for aquaculture research and development on marine, estuarine, and anadromous species. Work on anadromous species is coordinated with the Department of the Interior and the Department of Agriculture (Forest Service). The Office of Sea Grant conducts education, training, and advisory services in aquaculture; its advisory services programs are carried out in collaboration with the Department of Agriculture's Extension Service.

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Department of the Interior.—The Department of the Interior, through the Fish and Wildlife Service, is responsible for technical research and development of fresh water finfish for recreational and commercial purposes. The Department coordinates its research and development on anadromous species with the Department of Commerce and the Department of Agriculture's Forest Service. Its activities are conducted in Fish and Wildlife Service laboratories engaged in research on nutrition, disease, genetics, drug registration, and environmental effects.

IV. Resolution of problem areas

The general division of responsibility outlined above will be maintained by the three Departments. However, it is understood that some crossing of these lines of division may occur when necessary to advance national objectives in aquaculture. In such instances, this Agreement will be amended by a simple Memorandum of Understanding initiated by the Department requesting the "waiver," and signed by all three Departments.

V. Interagency coordination

It is agreed that the FCCSET Joint Subcommittee on Aquaculture is the principal mechanism for achieving coordinated planning, implementation, and evaluation of Federal aquaculture programs among the three Departments as well as among all the Federal agencies active in aquaculture.

To maximize coordination of aquaculture activities both within and among the Departments of Agriculture, Commerce, and Interior, each Department has established the position of Aquaculture Coordinator. In addition to performing those duties required to further the programmatic objectives of the Department he or she serves, the Aquaculture Coordinator is the principal representative to the Joint Subcommittee on Aquaculture and the focal point of communication among the three Departments.

M. RUPERT CUTLER,
Assistant Secretary for Conservation, Research and Education, Department of Agriculture.

RICHARD A. FRANK,
Administrator, National Oceanic and Atmospheric Administration, Department of Commerce.

ROBERT HERBST,
Assistant Secretary for Fish and Wildlife and Parks, Department of the Interior.

U.S. DEPARTMENT OF THE INTERIOR,
FISH AND WILDLIFE SERVICE,
Washington, D.C., December 28, 1979.

Hon. DANIEL K. INOUYE,
Chairman, Merchant Marine and Tourism Subcommittee, Committee on Commerce, Science, and Transportation, Washington, D.C.

DEAR MR. CHAIRMAN: I appreciated the opportunity to give testimony at the November 14 aquaculture hearings held by the Senate Commerce and Agriculture Committees.

Attached are the answers to three questions which you requested for the hearing record in your letter of December 3, 1979. I would look forward to answering any additional questions which you may have on the aquaculture activities of the Fish and Wildlife Service.

Sincerely yours,

ROBERT E. STEVENS, Ph. D.,
Aquaculture Coordinator.

Attachment.

AQUACULTURE RESEARCH ACTIVITIES

Question. You have discussed the Department's extensive and impressive aquaculture research activities. Can you describe how the Department coordinates its research efforts with the Departments of Commerce and Agriculture and how it makes its research findings available to private aquaculturists?

Answer. The Department of the Interior coordinates its research efforts in aquaculture with the Departments of Commerce and Agriculture through several established mechanisms. The Joint Subcommittee on Aquaculture was formed under the Federal Coordinating Council on Science, Engineering, and Technology in response

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to the need for increased coordination of aquaculture programs among Federal agencies. The subcommittee, chaired by Mr. David Wallace of the National Oceanic and Atmospheric Administration, meets on a quarterly basis with a structured agenda. The Department of the Interior, as an active participant on the subcommittee, strongly endorses this approach for identifying and avoiding costly duplication of Federal aquaculture programs. The success of this interagency cooperation through the subcommittee has been shown with the timely completion of a federal plan for aquaculture activities in the United States. Through the subcommittee, contracts have been let by the Department of the Interior to investigate regulatory constraints on aquaculture and by the Department of Commerce to study the financial assistance needs of aquaculture.

The Departments of Interior, Agriculture, and Commerce have also established the position of Aquaculture Coordinator within their agencies. These positions provide for interagency coordination and communication on a continual basis.

The Department of the Interior is associated with S–83 which is a group composed of other representatives from the Department of Agriculture, Tennessee Valley Authority, and Agricultural Experiment Stations in the Southern United States and Puerto Rico. The purpose of this group, funded through a Department of Agriculture Cooperative Research Project, is to coordinate regional research on freshwater food animals and to increase communications among aquaculture scientists.

The Department of the Interior houses the largest freshwater and anadromous finfish aquaculture program in this country and the methods to transfer research and development information to the private aquaculturist are being further refined. Public Law 85–342, which established our Fish Farming Experimental Station at Stuttgart, Arkansas, provided for the establishment of technical services to assist the commercial aquaculture industry. During Fiscal Year 1979 personal contacts by either our Stuttgart or Jackson, Mississippi, extension personnel totaled 1,569, letters 1,079, and telephone requests 1,352. A total of 375 fish disease diagnostic cases were handled by fish health experts at Stuttgart and Jackson.

In addition to the Fish Farming Experimental Station, five other aquaculture research laboratories under the National Fisheries Center offer a reduced level of information transfer and technical service directly to aquaculturists. These laboratories include the National Fish Health Research Laboratory at Leetown, West Virginia, the Tunison Laboratory of Fish Nutrition at Cortland, New York, the Fish Genetics Laboratory at Beulah, Wyoming, the Southeast Fish Cultural Laboratory at Marion, Alabama, and the National Fishery Research and Development Laboratory at Wellsboro, Pennsylvania. All aquaculture laboratories within the Fish and Wildlife Service also transfer the results of their research and development programs through presentations at scientific or technical meetings, through articles and papers in scientific or technical journals, and through reports and pamphlets distributed to the general public. The Fisheries Academy at Leetown, West Virginia, offers basic and advanced training to Federal, State, international, or private individuals in all aspects of fish culture. During Fiscal Year 1979, over 3,900 man-days of training were provided.

Interagency agreements have been signed between the Department of the Interior and the Departments of Agriculture and Commerce to facilitate information transfer. Under the terms of the agreements, the Fish and Wildlife Service will transmit research and development information to user groups through the extensive network of specialists in the Extension Service (Agriculture) and the Marine Advisory Service (Commerce).

Question. You mentioned that the Department is currently researching the potential of so-called "exotic species" for aquaculture. I have been informed by aquaculturists in Hawaii that the Lacey Act, which requires the Department of Interior to prohibit the importation of non-indigenous species, places unnecessary burdensome limits on aquaculture of some of these species. What is the Department doing to alleviate this problem?

Answer. The Lacey Act allows the Secretary of the Interior to prescribe by regulation any mammal, wild bird, fish (including mollusks and crustacea), amphibian, reptile or the offspring or eggs to be injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife resources of the United States and to prohibit importation of same, as well as transshipment between the continential U.S. and Hawaii or Puerto Rico. To date, only fish or viable eggs of the family Clariidae (walking catfish) and the live or dead fish or eggs of the family Salmonidae (salmon) have been so prescribed and prohibited.

All live or dead fish or eggs of salmonids of the fish family Salmonidae are prohibited entry into the U.S. for any purpose unless such importations are by direct shipment accompanied by a certification that the importation is free of the

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protozoan *Myxosoma cerebralis*, the caustive agent of the so-called "whirling disease," and the virus causing viral hemorrahagic septicemia or "Egtved disease." All other species may be imported, transported, and possessed, in captivity, without a permit, for scientific, medical educational, sale, exhibition or propagational purposes upon the filing of a written declaration with the District Director of Custom at the port of entry as required under paragraph 8, 14.61 of Code of Federal Regulations. Title 50. No such live fish, mollusk, crustacean, or any progeny or eggs thereof, may be released into the wild except by the State wildlife conservation agency having jurisdiction over the area of release or by persons having prior written permission from such agency.

The only non-native aquaculture species which cannot be imported and propagated are those species within the family Clariidae. For this reason, the Department feels that its regulations are not unduly restrictive of aquaculturists and is not contemplating the removal of walking catfish from its lists of injurious wildlife at this time.

Question. You referred to a Memorandum of Understanding among the Departments of Agriculture, Commerce, and the Interior regarding aquaculture. What do you envision as the Department of Interior's role under this MOU?

Answer. The Department of the Interior on October 23, 1979, accepted in principle the Memorandum of Understanding among the Departments of Agriculture, Commerce, and the Interior on the areas of responsibility in aquaculture. Under the terms of this agreement, the role of the Department of the Interior is as follows:

"The Department of the Interior, through the Fish and Wildlife Service, is responsible for technical research and development of freshwater finfish for recreational and commercial purposes. The Department coordinates its research and development on anadromous species with the Department of Commerce and the Department of Agriculture's Forest Service. Its activities are conducted in Fish and Wildlife Service laboratories engaged in research on nutrition, disease, genetics, drug registration, and environmental effects."

The Fish and Wildlife Service, through the Division of Fishery Ecology Research, is involved in technical research and development of freshwater and anadromous finfish. The Service has no expertise and no interest in assuming a role in commerce or the economic problems of the industry.

Senator STEWART. The next panel will be James Thornton, Associate Administrator, Farmers Home Administration, U.S. Department of Agriculture; C. K. Cardwell, Deputy Governor for Supervision, Farm Credit Administration, and Harold Theiste, Associate Deputy Administrator for Programs, Small Business Administration.

Again I would request that you gentlemen limit yourselves as far as your initial remarks are concerned. If you would reduce your testimony to as brief a statement as you possibly can make, we will proceed with questions.

Proceed, Mr. Thornton.

STATEMENT OF JAMES THORNTON, ASSOCIATE ADMINISTRATOR, FARMERS HOME ADMINISTRATION, U.S. DEPARTMENT OF AGRICULTURE

Mr. THORNTON. Thank you, Mr Chairman.[1]

We are pleased to be here this morning and, of course, we support the bill the administration referred to earlier, S. 1650. And what I would like to do here this morning is, first of all, acquaint you with how the Farmers Home Administration dates in the whole field of aquaculture.

I did not hear any mention made this morning, Mr. Chairman, I think it is in the State of Alabama at Auburn, the International Aquaculture Center, clearly advanced——

Senator STEWART. Do not worry, I will mention that a little later on.

[1] See p. 98 for the prepared statement of Mr. Thornton.

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Mr. THORNTON. I had the privilege and pleasure of visiting that center 2 years ago and I must say I was really quite impressed with the research that was going on, and also the training that is going on. People come from literally all over the world to train in aquaculture.

Senator STEWART. I was in Jordan, at the Embassy there, talking with people over there who had had Auburn University experts dealing with the Jordanians and attempting to teach them how to grow fish in the River Jordan. They are experts.

Mr. THORNTON. Mr. Chairman, as you probably know, and others may or may not know, Farmers Home Administration has some 34 or 35 individual lending programs, many of which, of course, are in the field of agriculture and those agricultural lending programs also encompass lending authorities for aquaculture as well as for agriculture. And those loans, of course, are for real estate as well as for operating purposes in terms of our regular lending. Again those same types of loans are made available to aquaculture operators, capital injections as well as operating credits.

Again, those are made to individuals, partnerships, cooperatives as well as to corporations and public bodies. In addition, we have a family of so-called emergency type of lending activities, again, which are not limited to agricultural production. It also encompasses or is made available to aquaculture as well as agriculture. We have made some of those loans to aquaculture operators as well.

Of course, these lending authorities also are basically provided under one set of appropriations; that is to say, the moneys provided for these lending purposes for aquaculture are the same moneys that are available for agriculture. In that sense, they have to compete.

In addition, we have what we call our business and industry (B. & I.) loan programs, which is a guarantee program. It is not a direct loan. It is a guarantee program for moneys provided by private lenders and we come in and support it up to a 90-percent guarantee.

And one of the important distinctions also is these other lenders or direct lending authorities we have, we can only make loans there when the prospective borrower cannot get credit from so-called conventional or other sources. They have to show evidence of that before they become eligible for these loans. That is not true in the case of the business and industry loan programs or guarantees. They can come direct to us for those loan guarantees if they have a lender.

And, of course, so far we have made some of the loans in both categories, both in terms of direct lending as well as business and industry. In fact, a survey that we did the other day indicates, in terms of our regular kind of farm-lending-type activities, the extent to which they have been taken advantage of for aquaculture purposes, we have some 363 loans we have made, amounting to some $15 million worth of credit for those direct-lending-type activities, both for real estate and operating purposes.

In the case of our business and industry loan guarantee programs, we have already loaned up to about $23.1 million in lending activities. We also have five applications pending for $9 million

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that we are reviewing. And again in the latter case, we are not only getting into the direct production of both fresh as well as marine type of production of aquaculture products, but in the B. & I. program, we are also increasingly getting into a lot of processing aspects of aquaculture, in terms of processing and distribution of those products.

Like any other lender, of course, be it private or government, we have to be concerned with all the many subjects we have discussed here this morning. People come to us for money for this or other purposes and we have to basically have certain kinds of credit requirements here in terms of the borrower being in a relatively secure capital position.

Senator STEWART. Do you make it tough on folks who are interested in aquaculture? Would you say your interest rates are higher or require a greater degree of collateral?

Mr. THORNTON. No, sir.

Senator STEWART. In other words, you do not provide any impediment in that situation?

Mr. THORNTON. Not at all, sir.

Senator STEWART. You do not put them into any special category?

Mr. THORNTON. No, sir; we do not. On the other hand, in terms of those so-called regular credit requirements, we ought not lose sight of the fact that those requirements sometimes pose some special difficulties for new kinds of enterprises, such as aquaculture in relationship to more established industries.

Senator STEWART. How?

Mr. THORNTON. Well, in terms of, for instance, in questions alluded to here this morning, and that is that you cannot totally separate economic issues and credit issues from some of these technical and regulatory issues that are prevalent in this particular industry. Plus the question of manageability. Like in any other loan, we have to have some degree of confidence in the level of risk we are taking on in making such loans. We have to be sure that prospective borrower has produced some evidence that he knows the business.

Senator STEWART. When you start the brand new industry that you have never been involved in before, but managerial experience in other areas, are you saying that you will take into consideration his experience in that regard? If you do, then there is no way in the world he can get it.

Mr. THORNTON. Well, if he has managerial experience and evidence that he knows something about the business, he does have some experience. We also have to have some evidence of the product they are going to produce, then we look at those credits.

Senator STEWART. A new product, a new species, a new field entirely, how does it give you a track record?

The reason I ask those questions, it is like a banker friend of mine that I know well now, when I first went back to practice law in Alabama I went down to borrow some money from him and he said, "I can't loan it to you. The reason I can't loan it to you is I don't know whether you're going to pay me back or not, because you have never borrowed any money from me."

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I hope to goodness you do not have that same kind of thing going on with the lending agencies here. I explained to him in fairly specific terms that I would pay the money back and I got the loan, and I paid it back. But I am wondering if we are setting those things up here.

Mr. THORNTON. There are several things to take into account if you are talking about a new enterprise. What we require there, normally, Mr. Chairman, is a feasibility study; that is basically some evidence on the part of usually a third party that the enterprise in question——

Senator STEWART. Who pays that?

Mr. THORNTON. Usually the borrower pays that.

Senator STEWART. In a mom-and-pop operation how much of a feasibility study are you going to require?

Mr. THORNTON. Well, we do not require a feasibility study if you can prove a mom-and-pop operation in terms of a so-called small fish farm operation. I am now referring to larger enterprises, maybe hundreds of thousands if not millions of dollars.

Senator STEWART. So you are flexible on that?

Mr. THORNTON. Yes. Fresh farming is something that we do have more of a track record. This is not exactly a brandnew industry. It has been around for some time. And, again, we will rely heavily on not only the evidence which the borrower presents us, but we have other sources that we can go to, such as land-grant colleges, extension and others in terms of trying to get a good feel for what kind of risks we are taking.

Senator STEWART. How responsive are they to your requests?

Mr. THORNTON. They are very responsive.

But, anyway, I have a list attached to my testimony, a list by States of where we have made loans, in both our agricultural as well as business and industry.

Senator STEWART. Well, I am glad to hear that you all do not set this aside because that is one of the complaints from some people.

Mr. THORNTON. No, we treat it, they are subject to the same rules as anyone else coming to us to make loans. And, of course, as has already been indicated here this morning, we are very much involved in these various interagency things in terms of trying to get a better understanding and participating in studies. All of that work will be extremely valuable to us as well as to other lenders be they government or be they private, in terms of getting a better insights into the so-called risks of that industry in order to evaluate credits.

Senator STEWART. Mr. Cardwell, are you ready to testify?

STATEMENT OF C. K. CARDWELL, DEPUTY GOVERNOR FOR SUPERVISION, FARM CREDIT ADMINISTRATION

Mr. CARDWELL. Mr. Chairman, I will, for your benefit, be very brief, and I will be happy to answer any questions you might have.

Senator STEWART. I have looked over your testimony and if you will begin on page 4 and highlight those comments, I will appreciate it. I have some questions to ask about that.[1]

Mr. CARDWELL. I will take those up in my brief comments, Mr. Chairman. I do represent the Farm Credit Administration which is

[1] See p. 100 for the prepared statement of Mr. Cardwell.

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the supervisory agency for the Cooperative Farm Credit System, which has no appropriated funds, but, rather, sells bonds in the public marketplace in order to lend to farmers. And, incidentally, by definition, aquaculture is agriculture to us. They are all farmers. We just simply call them farmers of the sea or farmers of the pond. It makes no difference in our policy of doing business.

Our activities up to this stage, by virtue of the fact we do not separate the domestic controlled waters loans in aquaculture, we tend not to get a very good handle on how much credit we extend. We have a lot of farmers who have a pond and the loan is simply a farm loan. But as best we could estimate in the last calendar year about $38 million was extended in credit directly for aquaculture production.

Senator STEWART. How much did you loan out in that period of time totally?

Mr. CARDWELL. A little over $50 billion. In addition to that, in marine fisheries since 1971 when we became involved, we have now outstanding $240 million worth of loans to approximately 2,400 individual fishermen, on all three coasts of the United States and a little up in Alaska.

We have some cooperative loans to cooperatives in canning and processing operations that back up the fishing fleet. And I might throw in a comment here to plug S. 1465 we have pending now before the Senate Agriculture Committee. Three proposals are included that would support and aid in this aquaculture field. Our land banks presently do not have authority to finance the real estate phase on shore. You know, docks, warehousing, and other facilities to back up the fishermen themselves.

We are also proposing to make eligible the other financing institutions and create the opportunity for them to discount their aquaculture loans.

Senator STEWART. I am a cosponsor of that legislation, and I am proud to be on it and I am proud of you all for what you are doing in this area, but $38 million is the amount you loaned totally and I know you could not get a good handle on it. That does not seem to be a very strong commitment. What is the reason for that? Was there a greater demand, or did that adequately meet the demand? If you cannot answer that, I can probably ask you a question you can answer. Can you give me some idea about that?

Mr. CARDWELL. I would say that except for new venture areas, we have met the demand where there is a credit worthy case and we give the same credit consideration to these as we would to any agriculture operation and due to the fact the System is not subsidized nor any of its funding guaranteed, we cannot depart from reasonable commercial credit standards.

Senator STEWART. This is quasi-public-type community though, is it not?

Mr. CARDWELL. Well——

Senator STEWART. Government-chartered to do a specific job?

Mr. CARDWELL. Yes.

Senator STEWART. Should you not consider at least the fact you are moving into a brand new area? As the first witness indicated, there is probably not a track record for some of these things. Can we separate it out and set the interest rate higher?

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Mr. CARDWELL. We do not. There is no favoritism or discrimination whatsoever. We do some guarantee loans with Farmers Home Administration too on those that are not credit worthy from an open market standpoint. So we are participating in that manner and I suspect we have some loans with Small Business Administration too.

Senator STEWART. What has been your experience with these loans you have made? Have they been pretty good credit risks in those areas? Do you have a high incidence of failure?

Mr. CARDWELL. No; we have had good luck with them. The thing I see in aquaculture, Mr. Chairman, is the competitive aspect and it is going to be difficult to measure with the change to establishment of a stable 200-mile-limit situation in 1976.

Marine aquaculture is evolving very rapidly and expanding. That was a good move. But, with that production of fish is increasing in the United States, and it is going to be directly competitive with the capital investment in the confined type like catfish and others. There will be direct competition and the alternative for resources inland are greater than they are in the offshore activities. So we are going to have a pretty stiff kind of a deal if we move it too quickly in either arena to the disadvantage of the other. I think the approach here, coordination, balance and careful assessment, is indeed appropriate.

With those comments, rather than belabor any of these other things, we have some loans going back 30 years on controlled oyster bed operations here in the Chesapeake Bay area. We have catfish loans; we have trout loans and we have crayfish loans, and we even have some frog loans in Louisiana, my home State, which is leading in bullfrog leg production. We even have a few loans on frog production under controlled conditions. We also have a little carp financing. There is a wide variety of production involved here.

The big problem I see is the underpinning of research and development so that an individual does not have to do it for himself. Someone had to prescribe a base and do the development, feasibility and things of that nature that the individual cannot spearhead for himself unless he has tremendous capital resources. Marketing and reporting is another element where help is needed.

Senator STEWART. In other words, the basic research, the market side and you feel like then you will take off and fly.

Mr. CARDWELL. It will take care of itself if economically sound and there will be financing available.

Senator STEWART. Thank you.

I have a vote on at 12 o'clock, so if you could summarize here. I hate that, but it is just a fact of life.

STATEMENT OF HAROLD THEISTE, ASSOCIATE DEPUTY ADMINISTRATOR FOR PROGRAMS, U.S. SMALL BUSINESS ADMINISTRATION

Mr. THEISTE. Thank you for the opportunity to comment on S. 1650.[1] The SBA supports S. 1650.

SBA's involvement in aquaculture began with the enactment of Public Law 94-305 in June 1976. Since the passage of that law, SBA offers its full range of assistance—financial, management,

[1] See p. 103 for the prepared statement of Mr. Theiste.

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technical, and disaster—to those qualifying in the aquaculture field.

It is difficult for us to determine exactly how much we have done in lending to the aquaculture industry due to a problem of the standard industrial classification coding. However, we think we have a general handle on that. Since we have had the authority we have done about $19.7 million of loans in that general classification. And of that we know that about $1.9 million went specifically to aquaculture companies.

We have asked the Department of Commerce for another standard industrial classification code for aquaculture so we can keep better track on that.

Recently SBA informally agreed to participate jointly with the Department of Commerce in providing whatever support and assistance we can to the saltwater aquaculture industry. The Department of Agriculture has agreed to assist the fresh water aquaculture industry.

I feel confident that through the work of your committees and the active participation of the necessary agencies in Government, the aquaculture industry will shortly become a viable partner in America's food production. We look forward to being a part of this endeavor.

Senator STEWART. I thank you very much for being here. I am going to have questions to submit to you for the record. I will have my staff provide them for you. We will leave the record open. There are some other questions that I would like to ask.

This seems to be one of the critical areas.

Thank you, gentlemen, for being here with us today. We appreciate your testimony and cooperation in making your statement.

[Subsequent to the hearing of Nov. 14, 1979, several questions were submitted to Mr. Thornton by Senator Inouye. The questions and answers thereto follow:]

U.S. DEPARTMENT OF AGRICULTURE,
FARMERS HOME ADMINISTRATION,
Washington, D.C., December 18, 1979.

Hon. DANIEL K. INOUYE,
Chairman, Subcommittee on Merchant Marine and Tourism, Committee on Commerce, Science and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your letter of December 3, 1979, forwarding followup questions in connection with the aquaculture hearings held by the Senate Commerce and Agriculture Committees.

Enclosed are our answers to the questions for insertion in the hearing record.

We welcome the opportunity to be a part of the proposed legislation. If you have further questions, please advise.

Sincerely,

JAMES E. THORNTON,
Associate Administrator.

Enclosure.

Question 1. In the case of a new venture for which there is no earnings record and no precedent elsewhere, would FmHA approve an application from a lender where the lender's 10 percent exposure was separately guaranteed by the applicant or by a third party?

Answer. Under FmHA regulations the entire loan amount must be secured by Collateral. It is not permissible to secure the unguaranteed portion of a loan with separate security. This provides for a true shared risk concept for the project. FmHA usually requires more than the minimum 10 percent equity for a new business.

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Question 2. In the absence of FmHA experience with an unprecedented aquaculture plan, would the Washington, D.C., based reviewers be willing to act on the local lender's decision in combination with a favorable recommendation from the State level office of FmHA?

Answer. All projects for FmHA assistance are required to be quality loans. Each application is reviewed for credit and feasibility to assure repayment of the loans. Application's are initiated at the State level and if recommended and above the State Director's $1 million authorization would be reviewed in Washington. This second review is quite comprehensive and independent of the States' review. If the project is found to be a viable one, a concurrence is given to the State Director to proceed and close the loan.

Question 3. If there is a project without precedent and without an earnings record, would you be inclined to act favorably if the applicant is fully qualified and has made a substantial financial and personal commitment to demonstrate the merit of the plan prior to applying for a federal loan guarantee?

Answer. Yes, provided the project is feasible. The applicants can submit either a pre-application letter or an application upon which FmHA will advise the applicant of it's decision.

Question 4. Is the policy of FmHA toward aquaculture sufficiently flexible and positive to allow loan guarantees to well proven projects in the three million to eight million dollar range even without an earnings record?

Answer. Yes. We have made many loans in this range and aquaculture is an eligible purpose for FmHA assistance. If a new business, additional equity may be required depending on the other credit factors.

[Subsequent to the Nov. 14, 1979, hearing, several questions were submitted by Senator Inouye to Mr. Theiste. The questions and answers follow:]

U.S. SMALL BUSINESS ADMINISTRATION,
Washington, D.C., January 21, 1980.

Hon. DANIEL K. INOUYE,
Chairman, Subcommittee on Merchant Marine and Tourism, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Thank you for your letter of December 3, 1979, to Mr. Harold A. Theiste concerning his testimony before your Subcommittee on November 14 on aquaculture.

In response to your request for answers to additional questions for the hearing record, I have listed the answers accordingly.

Question 1.—You stated that the SBA cannot now provide us with reliable statistics regarding its assistance to aquaculture. When can we anticipate that reliable statistics will be available?

Answer 1.—SBA field offices "code" businesses of various types in accordance with the book authored by OMB, "Standard Industrial Classification Manual." This book does not contain a code specifically for "aquaculture" and thus various codes are used, depending on the judgment of the loan officer as to which code comes nearest to the business being assisted. Until such time as a code is developed, it will be extremely difficult to be more precise. Request has been made of appropriate officials to develop such a code.

Question 2.—You state that SBA gives aquaculture loan applications "sympathetic attention." Can you tell us more precisely what the review process is for an aquaculture loan and what criteria are employed to determine "creditworthiness?"

Answer.—Aquaculture loans are considered by SBA as a part of farming activity. Since the passage of P.L. 94-305, which mandated assistance to farming operations, our field offices pay special attention to farm and farm-related applicants. Creditworthiness is determined in the same fashion as for other business loan applicants; that is, principally, the applicant must show repayment ability.

Question 3.—From your statement I gather that SBA's involvement with aquaculture is limited to saltwater aquaculture. What efforts has the SBA undertaken to fulfill this commitment in this area?

Answer.—SBA's involvement is not limited to saltwater aquaculture, although it is perhaps the case that most on-farm aquaculture operations are handled by programs of the Farmers Home Administration.

Question 4.—In its response to a letter from ten Senators, including myself, the SBA indicated that it would undertake efforts to convince lenders of the viability of loans to aquaculture enterprises. What actions has the SBA undertaken to fulfill this commitment?

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Answer.—Our approach is positive in all external and internal communications regarding this line of endeavor. Whenever we receive queries from aquaculturists about loan possibilities, we work with banks for a possible SBA guaranteed loan, and in so doing emphasize our interest in this subject.

I appreciate the opportunity you afforded SBA in appearing before your Subcommittee. Please be assured that we look forward to being of assistance, whenever possible, to the aquaculture industry.

Sincerely,

A. VERNON WEAVER,
Administrator.

Senator STEWART. Our last witness is Mr. Kenneth Ellis, who is with the U.S. Trout Farmers Association.

Mr. Ellis, I hate to put you under the same circumstances, but I will inform you though that you have some time, and we will have some time once the vote is announced. Go ahead with your statement and I have some specific questions to give you.

STATEMENT OF KENNETH ELLIS, PRESIDENT, U.S. TROUT FARMERS ASSOCIATION

Mr. ELLIS. In the interest of time, if you wish me not to read the statement, I will summarize.[1]

Senator STEWART. If you would, I would appreciate it.

Mr. ELLIS. My name is Kenneth Ellis. I am president of the U.S. Trout Farmers Association. And we represent trout growers in 48 of the 50 States.

We are here today to put our support with bill 1650, and we have some reservations. One of them is that even though we have a lot of interagency agreement, we feel that the bill is designed for the enhancement of aquaculture in toto, and I think the industry should have some input. We would like to see the viable industries that would be helped by this bill to be on the advisory committee or to have some status with these people to help develop this bill in its final stages.

Senator STEWART. Has your organization been requested to provide any information to the agencies at all during the time this bill was being formulated by members of the staff?

Mr. ELLIS. Not any members of the staff on this bill, no. I have been asked by a contract person from the executive branch where they mentioned a few minutes ago that they contracted to find our problems. I have been contacted by them and we have presented the trout industry's problems in relationship to what Government restraints and so on might be.

Senator STEWART. So you have had that opportunity.

Mr. ELLIS. We have had that opportunity.

The main thing that I would like to say is that in the areas of finance, and I have listened to a lot of testimony about finance. I am the one that quoted the 2 to 3 percent above the regular lending rate.

Senator STEWART. I read your statement, and that is where I got that information.

Mr. ELLIS. What we find is that Farm Credit Administration has been in Idaho, where I am from, a very viable organization through their short-term lending of PCA's. The Federal land bank, as far as I know in the United States, has never made a direct loan to

[1] See p. 104 for the prepared statement of Mr. Ellis.

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aquaculture. They have not to this day done their background to make a viable trout, catfish, any type of a loan, taking into consideration all the things that may be viable for a commercial operation.

And until someone does something like that, the small grower, the ma-and-pa operation cannot effectively increase, at least in the magnitude that it is capable of doing. We feel with the deficit, being substantially in aquaculture, we can contribute to this.

At the present time, we are limited to our own particular growth and that growth is limited to our financing, and our financing is very definitely limited.

Senator STEWART. Staff tells me that land-based activities are those that are handled by the Federal land bank. Are you saying that because of their reluctance to get involved in that particular aspect, you are limited in the way the industry can grow and develop?

Mr. ELLIS. Absolutely.

Senator STEWART. Do you know the reasons, or have they given reasons why they are reluctant to get involved?

Mr. ELLIS. Well, I think that—no they have not given the reasons except that redefinition of what aquaculture is, I believe that aquaculture by definition is the growing of aquatic species under controlled conditions on the high seas. I do not think there is any specific language that says that they can loan——

Senator STEWART. What are you talking about—specific language?

Mr. ELLIS. In their farm credit bill——their Farm Credit Act.

Senator STEWART. You are not talking about changes that are being suggested at this time.

Mr. ELLIS. No.

Senator STEWART. You are talking about the way this situation of credit exists.

Mr. ELLIS. Right. We testified on those changes and we were assured by the Farm Credit Administration that we already were a viable part of the lending process, but as of this date no loan has been processed.

Senator STEWART. Your testimony here is that no loan has been processed by a Federal land bank?

Mr. ELLIS. That is right.

Senator STEWART. There is reluctance on their part even though they have assured you are entitled to credit?

Mr. ELLIS. That is right.

Senator STEWART. Frankly, we will look into that. The testimony of the gentlemen preceding you was somewhat different. There might be some changes in the present bill that is before the Senate to accomplish what you want.

Mr. ELLIS. Mr. Chairman, he mentioned that they had made loans but they were not specific loans for aquaculture. They were loans to farmers of which catfish, mainly, was part of their operation.

Senator STEWART. Have they offered loans, or some of these Federal credit institutions in the agricultural area, offered loans at rates of 2 to 3 percent higher than loans——

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Mr. ELLIS. We cannot even get a bank to talk to us about loans right now.

Senator STEWART. Why?

Mr. ELLIS. The reason is that the industry is small. It has to use its own profits for its own increase. There is no real borrowing base at all. There is nothing, say in the Federal Reserve, there is nothing that says aquaculture is a viable industry. We in the trout industry believe that each situation is on its own merit as far as credit is concerned. But to this date we are considered special.

Senator STEWART. So financing is a problem then?

Mr. ELLIS. It definitely is a problem. With it, we could grow substantially and profitably.

Senator STEWART. Is that the general feeling of people involved in the industry?

Mr. ELLIS. Yes.

Senator STEWART. OK.

Where do you think the private sector should fit in research and development? That is one of the things that was mentioned in the demonstration aspects of aquaculture.

Mr. ELLIS. Research and development, we are presently working with the different agencies.

Senator STEWART. Are you getting any satisfactory results from that?

Mr. ELLIS. Yes. Quite frankly, there has been quite a change in the last several years.

Senator STEWART. What do you attribute that to?

Mr. ELLIS. I do not know. They are finally coming to us and we are talking and we are getting results and we are working with them on research projects. I do not know what I can attribute it to, but we are very happy about it.

Senator STEWART. Then you are able to find people who are trained in colleges and universities and agencies to assist you in meeting some of these kinds of problems?

Mr. ELLIS. Yes, we are; however, those that are trained usually are not trained in commercial aspects, or profit centers. They are trained in fisheries for public waters and so on, and they definitely have different——

Senator STEWART. Different approaches.

Mr. ELLIS. Yes.

Senator STEWART. And there is a need perhaps for some research in the commercial area?

Mr. ELLIS. I believe that.

Senator STEWART. And then applying that to commercial entities?

Mr. ELLIS. Yes.

Senator STEWART. Do you think that would be a benefit to the smaller type operations? Are the trout growers, or raisers, are those people generally mom-and-pop operations or are they larger sized industries?

Mr. ELLIS. There are just a few large ones and there has to be so that the ma-and-pa operator has a place he can basically process his product; the same I think in the catfish industry. But I would say 90 percent of the numbers of people are ma-and-pa organizations.

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Senator STEWART. Do they contract with the larger size organizations?

Mr. ELLIS. Usually they contract, yes.

Senator STEWART. To raise?

Mr. ELLIS. Yes; because they have no way to advertise their product or market their product.

Senator STEWART. Are there any cooperatives involved in that thing?

Mr. ELLIS. I believe there are several. I think Senator Warner lives in a State where there is a cooperative market association or co-op for marketing.

Senator STEWART. Based on his questions, he sounded like he is a member of it.

Mr. ELLIS. I think he probably is. Southern Appalachian Trout Growers Association, I believe, now is the co-op.

Senator STEWART. They work on a co-op basis?

Mr. ELLIS. Yes.

Senator STEWART. Do you need to add anything else to your testimony here?

Mr. ELLIS. No. I just appreciate the opportunity to testify here.

Senator STEWART. I appreciate your being here.

Do you think S. 1650 is an adequate response on the part of the administration and Congress to meet the needs of the aquaculture industry in this country?

Mr. ELLIS. I think it is the best basis of any bill I have seen so far.

Senator STEWART. Thank you very much for being here today.

This will conclude our hearing. The record will be left open for a week to receive responses to submitted questions.

Thank you.

[Whereupon, at 12 o'clock noon the committees adjourned, subject to call of the Chair.]

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APPENDIX

STATEMENT OF HON. MIKE GRAVEL, A U.S. SENATOR FROM ALASKA

Mr. Chairman, members of the committees, I thank you for the opportunity to appear before you today to comment on the aquaculture legislation which is presently under consideration by the Senate Commerce and Agriculture Committees. I appeared last year before both the Agriculture Committee and the Commerce Committee to testify on similar aquaculture legislation. In the year since that testimony was presented, my resolve in seeing aquaculture legislation which meets the needs of the country and the State of Alaska has only been strengthened. As each member here is quite aware, aquaculture is practiced in varying degrees of intensity throughout the world and I believe the time has now arrived to provide legislative encouragement for aquaculture activity in the United States.

Aquaculture—An overview

The world activity in aquaculture is wide and varied. China has been cultivating fish for over 2,000 years. Japan now produces more than 10 percent of its seafood needs through aquaculture. And Russia has been giving aquaculture increased attention.

The United States has been dabbling in various forms of aquaculture for a considerable period of time, but it has grown insignificantly here compared to such activities in other parts of the world.

My home State of Alaska has been involved in the cultivation of finfish since the late 1800's. With more than 50 percent of the entire U.S. coastline located within the State of Alaska, one can understand why my interest in aquaculture is great. The potential for marine aquaculture development within Alaska is truly incredible, not to mention the vast possibilities for future fresh-water cultivation.

Aquaculture—Market potential

World fishery resources were once thought to be practically unlimited. This has been clearly shown not to be the case. The world fishery resources are now estimated by some experts to be capable of yielding a maximum global harvest of 100 to 150 million metric tons per year. More conservative estimates rarely exceed 100 million metric tons, including that of the National Oceanic and Atmospheric Administration, which estimates that the 100 million metric ton figure will be met by 1980. This suggests that a world shortage of fish products is possible in the foreseeable future.

World per capita fish consumption has increased over the past several years and in the United States alone has risen to a present level of 12.9 pounds per person per year. Reliable estimates project American consumption to increase to 15.2 pounds by the year 2000. A Library of Congress study has predicted that in the same period of time overall demand for seafood products in the United States, both edible and industrial, is expected to increase by a full 80 percent.

All these indicators suggest that the demand for fish products will only continue to increase in the years to come. With wild fish stock exploitation reaching maximum levels, per capita consumption of fish products on the rise and the world population expected to increase from a level of 4 billion today to 6 billion by the turn of the century, aquaculture must be viewed as a promising possibility in helping to meet these food demands.

Aquaculture—Economic potential

For a nation practically surrounded by water and replete with possible sites for raising inland fish species, fishery imports into the United States are surprisingly high. In 1976 the United States imported 6.2 billion pounds of fishery products valued at $2.2 billion. The U.S. fishery exports in 1976 amounted to 241 million pounds, valued at only $330 million.

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This leaves a net annual trade deficit of practically $2 billion for foreign fish products where close to 65 percent of fish consumed in the United States is imported from foreign countries.

The studious application of aquaculture techniques could help to reverse this unfavorable balance of trade situation. A promotion of aquaculture will result in the creation of many new jobs, fishery employment on a year-round rather than a seasonal basis, and an overall stability to the historical boom or bust fishery economy.

NATIONAL AQUACULTURE ORGANIC ACT—INTENT

Mr. Chairman, the intent of S. 1408 and S. 1650 as well as H.R. 20 is to provide long overdue impetus to the promotion of aquaculture in the United States. My desire is to encourage the development of aquaculture of all types in all parts of the United States. This would include encouraging aquaculture for marine, as well as fresh water, species; for aquatic plants, as well as aquatic animals; for presently cultured species, as well as species as yet untested by the techniques of aquaculture; and for the rehabilitation and enhancement of public fisheries, as well as the promotion of commercial enterprises.

There are, however, three important areas which my bill, S. 1408, emphasizes, and I should like briefly to enumerate them:

First, I continue to believe that the national aquaculture development plan should be formulated only after information is systematically gathered from all parts of the United States. To ensure adequate input from interests as diverse as shrimp farmers in Florida, salmon ranchers in Alaska, oyster raisers in Maine and catfish farmers in the mid-west, information must be gathered on a regional basis. Only after these suggestions are received from all parts of the country should a national plan be drawn up. This will guarantee that the plan will be tailored to the varied interests and needs of aquaculturists throughout all 50 States. I believe the procedures for formulation of the national plan which are proposed in S. 1408 and H.R. 20 are preferable to that put forth in S. 1650.

Second, I believe that the enhancement and rehabilitation of traditional publicly owned fish stocks should be a major goal of this legislation. It seems obvious that in addition to encouraging development of commercial aquaculture for the private sector, we should not overlook the desirability of rehabilitating the numerous depleted fish stocks which are of vital importance to the public sector.

The third and final issue of importance my bill addresses is the problem of land and water access for aquaculture facilities. I believe the contributions which aquaculture can make in helping to meet nutritional needs, stimulating commercial activity, and enhancing existing fisheries warrant its being given due consideration in land and water use management deliberations.

CONCLUSION

Mr. Chairman, aquaculture is certainly an activity that has been neglected in this country for too long. The numerous benefits to be gained—commercial, nutritional and conservational, to name but three—have not yet been fully appreciated. Passage of this legislation will be a positive step towards translating these numerous potential benefits into tangible realities, and I urge favorable and swift consideration of these important legislative proposals.

U.S. SENATE,
Washington, D.C., November 13, 1979.

Hon. HOWARD W. CANNON,
Chairman, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Due to a conflict in my schedule, I regret that I will be unable to appear personally before your Committee on Wednesday, November 14, 1979 to offer testimony in support of S. 1650, a bill to provide for the development of aquaculture in the United States. I did want to take this opportunity, however, to explain to the Committee why I believe passage of S. 1650 is timely and in the very best interests of the Nation. Specifically, I would like to address three areas of concern which I feel merit your attention.

First, as you may know, the United States at present has no comprehensive aquaculture policy despite the fact that studies indicate that the development of such a policy statement is long overdue. Second, as you may also know, my State,

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the State of Hawaii, is already moving forward with a bold aquaculture development program with the anticipation that a commercially viable aquaculture industry can be expanded in Hawaii that will attract substantial investment capital and thus bolster the State's economy. Finally, with the appropriate emphasis on energy research and applied energy technology, there are immediate opportunities to bring about major reductions in the cost of producing, harvesting and processing aquatic-based food products. This last point is of critical importance in view of the continuing steep rise in the price of oil.

If I may, permit me to elaborate more fully on each of these topics. With regard to the question of whether or not this legislation is needed, I direct your attention to two general areas of interest for the U.S. In terms of the bill's domestic considerations, the United States has not had a strong history of consuming aquatic products. Yet we are increasingly being made aware of the nutritional role of these foods, and we can expect a shift to increased consumption by the U.S. population. To do this, we cannot rely on our commercial fisheries alone.

This can be seen from the status of our commercial fisheries. From 1950 to 1970, the total fish harvest for commercial operations increased from 21 million tons to about 70 million tons. Since 1970, however, the yield has remained more or less static or has actually decreased in some categories. Some authorities believe that the total world fish catch cannot much exceed the 100 million ton level without imperiling seriously the reproductive potential of valuable commercial stocks. At the same time, it is estimated that the total demand for commercial fisheries products will more than likely eclipse the 100 million ton level within the next two decades. Other authorities believe that serious depletion of certain commercially exploited fish has already occurred with irreversible consequences. One example cited is the blue-fin tuna whose numbers have decreased precipitously in recent years.

The only logical way to counteract such a perilous trend is to learn how to manage living aquatic resources. Aquaculture offers such a possibility just as land-based agriculture has developed technologies for managing a wide variety of plant and animal life.

The development of a marine-shrimp industry is an excellent example of this potential. Scientists at the Oceanic Institute of Hawaii recently announced that they have achieved promising results in reducing feeding costs for raising marine shrimp in a captive environment. If these preliminary experiments continue to show promise, it will provide a breakthrough of critical importance to the development of this new industry. This is an important consideration since the United States relies heavily on the importation of shrimp, some 300 million pounds annually, to provide for its domestic consumption. With the increasing protectionism that has resulted from the 200 mile seaward boundary of the extended economic zone; a very real potential exists for future restrictions in the supply of marine shrimp. A strong U.S.-based industry would avoid shortages or unreasonable costs for this commodity.

A good case can also be made for this legislation in terms of its international considerations as this country promotes the alleviation of hunger and malnutrition throughout the world. Based on a survey conducted in 161 countries, the United Nations Food and Agriculture Organization estimated recently that the world's undernourished stood at approximately 450 million, or a quarter of the underdeveloped world. Moreover, the U.N. group also predicted that the number is likely to increase in the years ahead.

Ironically, most of the population is located in the southern hemisphere of the world in areas most suitable for the development of aquaculture enterprises. Nonetheless, as populations continue to increase explosively, the ability to provide them with adequate nutrition is decreasing because more land is being reclaimed from agriculture to house more people and because naturally occurring animal and plant life is being over-exploited to fill the food gap. In particular, aquatic resources are in trouble.

I realize that it would be naive to suggest that aquaculture will be a cure-all for the world's nutritional problems. But at the same time, it would be equally naive not to recognize aquaculture's potential to contribute significantly to the alleviation of this problem. Some additional statistics are worth mentioning in this context.

Besides the direct need both at home and abroad for aquaculture products, the U.S. has an economic interest in developing a strong national aquaculture industry. According to a 1975 National Academy of Sciences Study, the United States produced 65,000 metric tons of fish through aquaculture that year. This represented slightly more than 3.4 percent of the total United States seafood demand. Although commercial aquaculture operations are located at various sites throughout the

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entire United States and its coastal waters, it is not yet a large industry (only about $100–200 million in total worth). Nevertheless, it has been estimated that the industry will double its output by 1982 to about $375–400 million.

Even more optimistic projections have been made both in this country and abroad:

Biologist at the National Marine Fisheries Service in Seattle have estimated that aquaculture developments totaling, 500,000 acres could produce 20 billion pounds of fish in 25 years, enough to maintain per capita fish consumption in an expanded U.S. population of 300 million.

One estimate holds that in the United States with the present state of aquaculture technology, production by aquaculture could be increased between three and five times from current production levels and that a more concentrated effort could result in a fifteen-twentyfold increase in production. That means that the United States could theoretically produce up to 1.4 million tons of seafood from aquaculture, given the stimulus to do so. Such a production level would account for nearly one half the present annual U.S. consumption of seafood (3.2 million tons).

A recent Senate Committee Print on Soviet Oceans Development (1976) acknowledges the Soviet's interest in aquaculture and concludes that Soviet emphasis on aquaculture is increasing for two fundamental reasons: First, the Soviets perceive that the future return from ocean fisheries will decreaso as demand increases; and second, the rapid development of marine biology, ecology and engineering has made it possible to develop aquaculture as a major component of the economy, like agriculture. Some Soviet officials have predicted that maritime areas will be eventually utilized for aquaculture "up to a depth of 100 yards and up to one mile off the shore by the end of the century." It is apparent, then, that the Russian emphasis on aquaculture anticipates that the production potential of the fisheries industries will dwindle while the demand for fisheries products will continue to increase. They have chosen aquaculture to help fill the anticipated supply-versus-demand gap.

Moreover, in a report prepared for Congressional hearings held on the House side in 1976, two important conclusions were reached. The first was that a review of the status of aquaculture in the world indicates aquaculture projects are contributing significantly to the economies of other countries but very little to the U.S. economy, despite an extensive import market for seafood. The second conclusion was that aquaculture could coexist very profitably with agriculture in the United States and provide an added benefit by reducing the balance of payments deficit resulting from the importation of seafood and related products into the U.S. markets.

An additional aspect of this legislation which I believe merits your attention is contained in the just-completed National Research Council report entitled "Aquaculture in the United States, Constraints and Opportunities." The statement reads as follows:

Our analysis of the production, science, technology, economics, business, law, and administration of aquaculture indicates that, in the United States, aquaculture will have only a minor impact on food production in the near term, in comparison with other food production systems. We have been unable to make a definitive statement about the exact future role of aquaculture as a source of food in the United States. It is, however, our considered opinion that in the long term, aquaculture will be a means of increasing protein supplies. We believe that aquaculture has the potential to contribute to increased food production. If this potential is to be tested, expenditures for current programs and for research and development must be increased.

Moving to the second point I made in my opening statement, I would like to comment briefly on the bold aquaculture initiatives currently being undertaken in my home State, Hawaii. The March 1978 issue of the prestigious trade journal, The Commercial Fish Farmer, was devoted exclusively to articles describing these initiatives. Indeed, the subtitle of that issue was headlined "Aquaculture in Hawaii."

Because Hawaii experiences year-round climatic conditions favorable to aquaculture development, it has, in my view, the potential for becoming the aquaculture capital of the United States. Freshwater prawns (related to shrimp) and certain species of fish are already being produced commercially. The potential for the production of other forms of aquatic life in Hawaii is, according to all available reports, almost limitless. We have the potential for raising and producing commercially both freshwater forms (catfish, prawns, crayfish, etc.) and saltwater forms (oysters, clams, marine shrimp, a variety of fish species such as mullet and milkfish, seaweeds, etc.). But by accounts, the development of this potential is going to be a costly undertaking. Land suitable for aquaculture is both scarce and expensive. Furthermore, government regulations, both Federal and local, tend both to inhibit aquaculture development and to escalate project costs. Finally, the economics of

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aquaculture (e.g., supply versus demand; market expansion and perishability of aquaculture products) render it a risky investment.

As a developing technology, Hawaii recognizes that aquaculture programs are going to require large infusions of money for research. Specifically, funding is needed to broaden the scope of research in basic biology, genetics, disease control and a wide range of husbandry management techniques for virtually all of the aquatic life forms identified now as having commercial potential. Like agriculture in its infancy, it isn't yet known how to manage aquatic animals and plants with absolute reliability when they are crowded together in a cost-efficient, intensive aquaculture environment. Fiscal and tax incentives will also be needed to encourage the technological and commercial development of aquatic life forms under these conditions. It is asking too much of entrepreneurs and venture capitalists to produce the funds themselves to undertake the research and development costs necessary for commercial interests.

The issue of funding research and development costs for aquaculture leads me to the last topic I wish to discuss, and that is the compelling need to bring about the reduction of the energy costs associated with producing, harvesting and processing aquatic-based food products.

The development of traditional land-based agriculture has proceeded without a major concern for its energy costs. However, with today's mounting costs for oil, it is imperative that food and energy policy planners work together to promote energy efficiency. Only in this way will we be able to assure an adequate diet at a reasonable cost for people both here and abroad.

Since aquaculture is an expanding industry, it is a prime candidate for including energy considerations in its basic structure. This point has received the attention of some of our foremost food planners, including Jean Mayer, President of Tufts University, and John Bardach, a leading aquaculture authority at the East-West Center in Hawaii. The conclusions which these scientists report are important if we are to promote the successful development of a U.S.-based aquaculture industry.

What this means is that the formulation of a National Aquaculture Policy statement must include a variety of options to promote the direct savings of fuel and fuel-demanding inputs. For example, fertilizer costs may be reduced through the use of recycled organic wastes from the animal husbandry and crop production industry. Tax benefits may also be necessary at the outset to encourage such waste recycling. However, as the energy efficiency of these strategies become apparent—i.e., production costs maintained at a reasonable level—those practices will spread as a natural part of aquaculture's development.

In addition, it is necessary to promote energy analyses in order to determine the proper size of aquaculture farms. In the past, cheap energy has promoted large to very-large scale agricultural enterprises. However, we need to find out if small-scale operations are more energy efficient for aquaculture. The point of this critical analysis will be to encourage the construction of aquaculture operations which are consistent with the wise and minimal use of energy supplies.

With the proper research, planning and development, the use of aquaculture as a means of supplying high-grade animal protein need not be energy expensive. In fact, if polyculture and organic waste recycling are employed, the protein produced may be cheaper in terms of energy requirements than the rearing of pigs or chickens.

In conclusion, I firmly believe that the U.S. has the ability to provide the innovation required to develop an aquaculture industry. What is needed is a statement of national policy which will promote adequate planning, research and development of this country's aquaculture resources. In my judgment, the proposed bill, S. 1650, accomplishes this important objective, and I urge its favorable consideration by your committee.

Thank you very much for giving this matter your attention.

Aloha and best wishes.

Sincerely,

SPARK MATSUNAGA, *U.S. Senate.*

STATEMENT OF HON. LLOYD BENTSEN, A U.S. SENATOR FROM TEXAS

It is a pleasure to testify in support of S. 1650, the Aquaculture Act of 1979. I am a cosponsor of this bill because I believe that there is a tremendous untapped potential for aquaculture in the United States and throughout the world. Aquaculture has been practiced for at least 4,500 years in China and it can be dated back about 100 years in this country. Commercial aquaculture production started in the United States about 1960 and since that time, preduction has grown from some 2 million pounds of fish to over 100 million pounds.

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However, it is obvious that we have barely scratched the surface of our potential production. Aquaculture now accounts for some 10 percent of world fish production. In some countries aquaculture supplies as much as 40 percent of domestic fish product consumption. However, in the United States, aquaculture supplies only some three percent of our domestic consumption needs.

Worldwide demand for fish products is increasing both with our increasing population and with changes in dietary habits. Per capita U.S. consumption of fish, for example, has increased by some 2 pounds since 1969 after being almost unchanged since 1909. By contrast, the world commercial fish harvest has gone for some 21 million tons in 1950 to approximately 70 million tons in 1970. However, since 1970 the world commercial fish harvest has remained relatively constant, and there is great concern that some commercial fish species are now being harvested at or above the level of their maximum sustainable yield.

In addition to the potential ecological impacts of over-fishing there are economic impacts as well. Fishery product imports cost the U.S. economy $2.6 billion in 1977.

The potential for domestic business has already resulted in commercially viable aquaculture enterprises producing catfish, trout, salmon, oysters and crawfish, among other species here in the Untied States. Although very small in relation to its potential, aquaculture is already an established industry in my home state of Texas and I predict that it will be growing rapidly in the not too distant future.

Shrimp fishing, in particular, has been receiving a lot of interest from researchers and private businesses in Texas. Scientist at Texas A&M University, one of our nation's sea-grant universities, have been very successful in raising shrimp in captivity using the thermal effluent from a power plant in Corpus Christi, Texas. Success within the last few years in breeding shrimp in captivity is promising to make large-scale shrimp farming operations commercially viable, and the ideal growing conditions of the Laguna Madre may soon be supplementing the commercial catch of wild shrimp in the Gulf of Mexico.

The potential importance of aquaculture on a global scale cannot be underestimated. A large portion of the world's population goes to bed hungry each night. A shortage of food in the areas where it is most needed is a critical problem in this world. Moreover, the world food shortage is much more than just a shortage of food. Most importantly it is a shortage of protein. Protein is the single most vital element in an adequate diet and it is also the nutrient in shortest supply world-wide. Without adequate protein supplies during infancy the human brain does not develop properly. The result is mental retardation that cannot be reversed even if protein supplies are adequate in later years. Aquaculture produces protein. It produces a high quality protein in large amounts very, very efficiently. The stimulus to aquaculture development that this bill will give will eventually prove very important to the economies of Texas and of the United States. Even more far-reaching, however, is the mind-boggling impact which the adequate protein supply of the modern aquaculture industry would have on the developing nations of the world, which for the most part are located in tropical areas which are most ideally suited for aquacultural production.

The potential of aquaculture has been recognized and documented. Including among them are the bill Congress passed last year and this bill, S. 1650. S. 1650 is not as broad or as far-reaching as earlier proposals. It is a compromise which has been some three years in the making. It will bring much-needed coordination to the efforts of the various agencies and departments which are involved in aquaculture. It will allow future efforts in aquaculture to be better and more efficiently directed to make the best use of our scarce financial resources in stimulating the boundless and exciting potential of our aquaculture resources. I urge favorable consideration of this bill.

STATEMENT OF HON. LOWELL WEICKER, JR., A U.S. SENATOR FROM CONNECTICUT

Mr. Chairman, I am pleased to have the opportunity today to testify before the Commerce, Science and Transportation, and Agriculture Committees in support of aquaculture legislation. The bills before us today, S. 1650 and S. 1408, are the most recent legislative proposals to provide for the development of aquaculture in the United States.

Previous testimony, in the 94th, 95th and 96th Congresses, has established the need for the development of aquaculture in the United States. It is accepted that the United States has a serious balance of trade deficit in seafood products and that aquaculture in this nation has the potential to significantly increase seafood production and, therefore, contribute to the reduction of that deficit. In addition, aquaculture will be able to help meet the world's increasing demand for seafood products at

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a time when world fisheries catches have reached their limit. It was in response to these conditions that H.R. 9370 was passed by Congress last year.

H.R. 9730 would have provided the strong focus and helping hand needed to develop aquaculture in this nation, among its provision:

Establishment of a National Aquaculture Development Plan;

Coordination of federal agency activities regarding aquaculture;

Loan guarantees for aquaculture facilities;

Insurance against losses incurred in aquaculture facility operations; and

Establishment of a federal aquaculture assistance fund.

However, the bill was pocket vetoed by the President on October 19, 1978. Although the President supported the purpose of the bill, to develop an aquaculture industry, he was concerned about offering new government incentive such as loan guarantees and insurance programs unless and until a clear need for them had been established. In addition, the President felt that present federal activities (there are 11 federal agencies directly involved with aquaculture) would only be duplicated by the bill.

Two contrasting legislative approaches toward the development of aquaculture are represented by the two bills before us today. S. 1408 is a similar but less costly version of H.R. 9370, the legislation which was passed last year by Congress and subsequently vetoed by the President. S. 1650, on the other hand, responds to the President's concerns, by not including provisions for a federal loan guarantee program, insurance program, revolving fund or grants for demonstration projects. In lieu of the loan guarantee and insurance programs, S. 1650 includes studies to determine if these programs are needed.

I firmly believe that the development of aquaculture will require both a strong focus for government activities and an incentive program to give the industry an initial boost. Current federal activities have been ineffective in developing aquaculture because they do not provide strong leadership or a clear focus. A young industry such as aquaculture needs a strong guiding hand, not the disjointed efforts of 11 government agencies. It is for this reason that I believe any aquaculture program which relies solely on existing federal activities and does not provide a strong focal point will end in failure.

There have been many efforts to develop aquaculture in the past. The number of government agencies is testimony to that fact. I am very happy to see the new effort here today and I am hopeful that we can develop legislation which will provide the sustained support and guidance needed to develop the aquaculture industry.

My greatest concern is that the need for financial incentives is not recognized in S. 1650. Several other nations, particularly Japan and the Soviet Union, are undertaking ambitious programs to develop their aquaculture potential while the United States, with a potential at least as large, cannot authorize even a modest incentive program. I have little hope that despite past disinterest the Small Business Administration, the Farmers Home Administration, and the Farm Credit Administration will find new energy as aquaculture advocates. I believe that a new authority which has the expertise to properly evaluate aquaculture proposals is needed. Past Congressional testimony and government studies indicate that financial incentives are necessary for the development of an aquaculture industry in this nation. The 1977 Eastland Fisheries Study recommends: "Provid(ing) long-term low-interest loans with amortization flexibility for aquaculture." (Eastland Fisheries Study, p. 23, May 1977)

And the report of the recent House Merchant Marine and Fisheries Committee on H.R. 20 states: " * * * the aquaculture industry as presently constituted, is in dire need of venture capital which these federal programs fail to provide." Rept. 96–198, part 1

However, in response to the Administration's concerns, Sec. 8 of S. 1650, contains provisions for a capital requirements study only. This study will, hopefully, end the debate on the need for incentive programs. But until then, I am convinced of the need for and support the inclusion of a loan guarantee incentive program in any aquaculture development bill. I feel a great urgency in regard to the development of aquaculture. Even with an ambitious program it will take many years before aquaculture production will show significant gains.

I am also greatly concerned that S. 1650 does not provide the communications focus needed by aquaculture. For instance, if I wish to begin a small fish or oyster farm, which of the 11 government agencies do I write to for information? Although S. 1650 does provide for a useful information service it does not go far enough in promoting communications between the Federal agencies and the aquaculture industry. I would like to propose amendments to identify this information service as the Aquacultural Information Service and require that it be given a single mailing

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address and be able to provide useful aquacultural information to interested persons. This amendment will establish a vital link between government agencies and practicing or potential aquaculturists. A single mailing address, at which point information can be collected and inquiries can be answered, will avoid much of the confusion that has frustrated previous efforts to gather aquacultural information.

I am greatly encouraged by the efforts that have been made in behalf of aquaculture in the last few years and I hope it signals the beginning of significant development. Thank you for the opportunity to express my views.

Intended to be proposed by Mr. Weicker:

Viz: Beginning on line 15, page 12, strike out through line 18 and substitute the following:

(A) establish and maintain, with a single mailing address, the Aquaculture Information Service for the collection and analysis of scientific technical, legal and economic information relating to aquaculture, and the dissemination of this information in a useful form to interested persons.

STATEMENT OF BILLE HOUGART, AQUACULTURE COORDINATOR, U.S. DEPARTMENT OF AGRICULTURE

Mr. Chairman and Members of the committee, I am pleased to be here this morning to discuss S. 1650, the proposed "National Aquaculture Act of 1979" and S. 1408, the proposed "National Aquaculture Organic Act of 1979." Mr. Chairman, the Department of Agriculture strongly supports S. 1650. The Department is opposed to S. 1408 because it contains premature and questionable financial programs.

S. 1650 recognizes the progress made in coordinating Federal aquaculture activities in the Joint Subcommittee on Aquaculture. The Subcommittee is an activity of the Office of Science and Technology Policy. In our opinion, the effectiveness and feasibility of coordinating aquaculture matters through this Subcommittee are now well demonstrated.

Through the Subcommittee, member agencies, including the Department of Agriculture, have taken positive and aggressive steps to provide for studies of regulatory constraints and sources of financial assistance to aquaculture. These studies are called for in S. 1650.

The Subcommittee has also done much to produce a National Plan for Aquaculture. This, as you know, is an enormous task. However, I am pleased to note that the first draft of the Plan should be available before the end of this year. The preparation of such a Plan is also required in S. 1650.

Mr. Chairman, the Department is satisfied with the progress we are making in the Joint Subcommittee. We are also pleased with the progress we have made within the Department to strengthen our support of aquaculture.

As you know, Mr. Chairman, the Department has historically provided services to fish farmers as well as those involved with other farming enterprises. The Department's interest in aquaculture is further established by the Food and Agriculture Act of 1977 (Public Law 95-113) which provides a role for the Department in supporting food and agricultural sciences, including aquaculture.

Advice and technical assistance are being provided to individuals in connection with land and water resource appraisals, basic biological principles, and the design and layout of fish farming facilities. The Department, through a Memorandum of Agreement between the Science and Education Administration's Extension unit and the Department of Commerce's Office of Sea Grant, cooperates in providing field advisory services on marine aquaculture. Financial support through the Hatch Act formula funds is being provided to universities for research on many aspects of aquaculture. Research on nutritional value, safety, and marketing of aquacultural products; on waste disposal; and on the economics of various facets of the industry is being conducted. Vaccines which are used for controlling aquacultural diseases and shipped in interstate commerce, are produced by private industry but under Departmental licensing and supervision. Assistance is provided in disease diagnosis, processing, handling, and marketing. Loans may be provided to establish or expand aquaculture enterprises and to offset losses occurring due to natural disasters. A more detailed explanation of specific Departmental activities in this area is included as an attachment.

Since 1976, USDA has increased its emphasis on aquaculture to give it a higher profile within the Department. An Aquaculture Coordinator for the Department has been hired. A USDA interagency aquaculture work group has been established composed of personnel from ten USDA agencies. The work group has been active since its inception to make the Department responsive to and involved with the aquaculture industry and is currently developing an Aquaculture Plan for the

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Department. As part of this effort, the Department recently convened an aquaculture workshop at which key representatives from the aquaculture community provided input to our planning process. We anticipate having this USDA Aquaculture Plan completed before the end of this year.

Mr. Chairman, the Department is committed to aquaculture. The USDA aquaculture effort is well coordinated with other Federal aquaculture activities, and we are constantly exploring ways to increase and improve our services to the aquaculture community.

It is the policy of the Department of Agriculture to undertake those research, technology transfer, and assistance programs and activities necessary and appropriate to facilitate the development of an active and viable U.S. aquaculture industry.

S. 1650 would provide a meaningful statement of the importance of aquaculture and strengthen our efforts to support this important industry. The Department is pleased to support S. 1650.

Mr. Chairman, I will be happy to answer any questions that you or your colleagues may have.

ADDITIONAL MATERIAL FROM BILLE HOUGART, AQUACULTURE COORDINATOR, U.S. DEPARTMENT OF AGRICULTURE

The following is a more detailed explanation of the U.S. Department of Agriculture's role in aquaculture.

Soil Conservation Service (SCS)

With field offices in nearly all counties in the United States, the Soil Conservation Service (SCS) is able to work directly with landowners and operators whose desires and farm resources indicate a satisfactory opportunity for some aspect of aquaculture.

The SCS assists the would-be aquaculturists to assess the potential of resources for growing and marketing products and to match resources with the right kind of enterprise.

Assessment of resources includes: (1) water quality (field testing), (2) water quantity, (3) soils information, (4) market potential (general), (5) human resources, and (6) financial resources.

The small percentage of survivors of this initial resource appraisal (estimated to be less than five percent) then are given detailed assistance in developing a resource conservation plan considering: (1) water quality (monitoring and measuring), (2) water quantity (monitoring and measuring), (3) cost-return analysis (break-even point), (4) fish habitat management, (5) specific soils information, (6) site limitations (physical), and (7) design and layout. Where Farmers Home Administration (FmHA) financing is involved, the SCS may be requested to inspect construction as it proceeds.

The SCS technicians usually do not aid in day-to-day management of the operating facilities. They do occasionally assess specific problems that may develop such as oxygen deficiencies and bank erosion and may provide fish farmers new research results and results of experience gained by others. The diagnosis and treatment of diseases are referred to other agencies or private consultants for assistance with those problems.

In addition, the Reseurce Conservation and Development (RC&D) Program provides opportunities for local units of government and nonprofit organizations to participate in aquaculture. Three avenues are available. The first is through authorities relating to public water-based fish and wildlife development which could provide for participation on some aspect of aquaculture. The second avenue is the conducting of studies focusing on such aquaculture item as inventorying and evaluating opportunities and marketing surveys. The third avenue is through utilizing RC&D loan authorities which include "the conservation, development, and utilization of water for aquacultural purposes" (Public Law 95–113).

A major reduction is proposed for RC&D in the fiscal year 1980 budget since reviews of RC&D have been unable to demonstrate statistically significant economic progress towards program objectives. RC&D is proposed to be phased out in fiscal year 1981.

In fiscal year 1977, the SCS provided technical assistance with fish management on 37,923 ponds and 4,442 acres of commercial fishponds.

Science and Education Administration—Extension (SEA–E)

The Science and Education Administration (SEA) is the Department's primary research and education Agency. A SEA Program Manager for Aquaculture has been appointed and a SEA Aquaculture Program has been developed as part of the

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overall USDA Aquaculture Plan. Major SEA components are described in the following pages.

The Science and Education Administration—Extension (SEA–E), as the educational arm of the Department of Agriculture, is charged under the Smith-Lever Act "to aid in the diffusing among the people of the United States useful and practical information on subjects relating to agriculture, uses of solar energy with respect to agriculture, home economics, and to encourage the application of the same." The Act further provides that "this work shall be carried out in such a manner as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges * * * receiving the benefits of this Act."

Thus, using research information provided by the State experiment stations and other research agencies, SEA–E, through State Cooperative Extension Services has been actively engaged in educational programs in fishpond management in 26 States, and added programs on marine resource education, the commercial fish industry, and the Department of Commerce's Sea Grant Program. In the freshwater area, activities include: fish bait production (17 States), catfish farming (15 States), and trout farming (5 States). A demonstration project was initiated in 1976 by the Texas Cooperative Extension Service to evaluate catfish production as a supplemental source of food and income for small and low income farmers. One State, Louisiana, has an intensive crawfish production program.

Activities have been expanded in the marine areas since SEA–E negotiated a Memorandum of Understanding with the Sea Grant Program. In 20 States, SEA–E is carrying out educational programs under mutual agreement.

Recently, SEA–E personnel have been conducting educational programs on economics and management of aquatic animal harvesting, processing, storage, and marketing.

Science and Education Administration—Cooperative Research (SEA–CR)

The Science and Education Administration—Cooperative Research (SEA–CR) financially supports research on aquaculture at the State Agricultural Experiment Stations of land-grant colleges. This involves research projects having a total scientific manpower input of about 20 scientist-years. The combined total effort on all aquaculture projects at these State institutions is about 50 scientist-years.

Research is being conducted on several major aspects of aquaculture, including the breeding of aquaculture species for more efficient growth and more uniformity of product at harvesting; nutritional studies to define requirements for more efficient production of the various species; cultural methods for optimum production, such as water temperature and quality, stocking rates, harvesting methodology, raceway culture, and other practices for optimum production. Methods of disease and parasite control to reduce losses are being studied. Processing and marketing studies are in progress to improve product quality and nutritional value, product acceptability, and greater efficiency in processing and marketing aquaculture products.

The SEA–CR funds also support a Regional Research Project (S–83) entitled, "Freshwater Food Animals." Through this project, scientists can exchange unpublished research information, jointly plan future research activities, and avoid duplication of research. Nine State institutions and several Federal agencies (TVA, USDI, USDC, and USDA) participate in the project.

Science and Education Administration—Agriculture Research (SEA–AR)

The Science and Education Administration-Agricultural Research (SEA–AR) currently conducts some research directly related to aquaculture. This includes studies on the pesticide levels in catfish processing wastes and feasibility of recovery and conversion of processing wastes to animal or fish feed.

The SEA–AR also conducts research indirectly related to aquaculture. Such areas include the prevention of water quality degradation of pesticides, animal waste, and sedimentation from agricultural operations. The thrust, however, is not directed specifically or exclusively to aquacultural production.

Farmers Home Administration (FmHA)

The Farmers Home Administration (FmHA) of the U.S. Department of Agriculture channels credit to farmers, rural residents, and communities. It attempts to help borrowers gain maximum benefit from loans through counseling and technical assistance.

Some loan programs are strictly for individuals and their families. Some involve associations or people. Other loans are made to partnerships, cooperatives, corporations, or public bodies. FmHA employees work in concert with all types of borrowers as well as with State and local officials, planning groups, and government agencies.

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The Agency's loan authorities provide a supplemental of credit, augmenting the efforts of the private lenders rather than competing with them. Most FmHA programs require that a borrower "graduate" to commercial credit when able to do so.

Major purposes of FmHA's rural credit programs include:

1. To help build the family farm system, the economic and social base of many rural communities.

2. To expand business and industry, increase income and employment, and control or abate pollution.

3. To install water and waste disposal systems and other community facilities that will help rural areas upgrade the quality of living and promote economic development and growth.

4. To provide or improve modest homes in suitable rural environments at prices and on terms that families of low or moderate income can afford.

Most of the loan programs fall into two categories:

Guaranteed loans in which the loan is made and serviced by a private lender. FmHA guarantees to limit any loss to a specified percentage. Interest rates are determined between borrower and lender except farm emergency loans where the interest rate is established by law.

Insured loans that are originated, made, and serviced by the personnel of the agency. The notes evidencing the loans are sold backed by the full faith of the government, and the sales proceeds replenish revolving loan funds. For most programs, interest rates to borrowers are determined by the current cost of Federal borrowing.

Statutory authorities and present programs

FmHA administers several loan programs that can provide credit to aquaculture operators. These programs and the authorities for them are as follows:

1. *Emergency Loans (EM).*—EM loans are made in countries where property damage or severe preduction losses have occurred as a result of a natural disaster, or has been made eligible for Federal assistance by a major or emergency declaration by the President.

EM loans are made to eligible established farmers, ranchers, and aquaculture operators doing business as individuals, cooperatives, corporations, or partnerships, for losses, major adjustments, operating expenses, and other essential needs arising from disasters so that they may continue their operations.

EM loans are authorized by Subtitle C of the Consolidated Farm and Rural Development Act. Section 321 of the Act provides, "For the purposes of this subtitle 'aquaculture' means husbandry of aquatic organisms under a controlled or selected environment."

2. *Economic Emergency Loan (EE).*—EE loans are made to bona fide farmers or ranchers doing business as individuals, cooperatives, corporations, or partnerships, who are suffering economic hardships because of a general lack of farm credit. EE loans are available when farm credit is hard to get because of national or areawide economic stresses, such as a general tightening of agricultural credit or situations such as high production cost and low prices for farm goods. EE loans can be made to eligible farmers and ranchers continue their normal operations during a temporary economic emergency.

EE loans are authorized by the Emergency Agricultural Credit Adjustment Act of 1978. Section 202 of the Act provides, "As used in this title, the term 'agricultural production' shall include aquaculture * * *."

FmHA's EE loan regulations provide: "Aquaculture. The husbandry of aquatic organisms by an applicant or borrower under a controlled or selected environment. Aquaculture operators are considered to be farming operations. Aquatic organisms may consist of any species of finfish, mollusk, or crustacean (or other invertebrate), amphibian, reptile, or aquatic plants."

3. *Operating Loans (OL).*—OL loans are made to provide credit and management assistance necessary to family farmers or ranchers doing business as individuals, cooperatives, corporations, or partnerships. A range of family farmers may be eligible for OL loan assistance; however, one objective is to assist limited resource operators, new operators and low-income operators. OL loans enable family-farm operators to make efficient use of their land (including water), labor, and other resources to improve their living conditions and to improve their economic situations. OL loans can be made for any necessary operating expenses.

OL loans are authorized by the Consolidated Farm and Rural Development Act. Section 343 of the Act provides: "As used in this title (1) the term 'farmer' shall be deemed to include persons who are engaged in, or who, with assistance afforded under this title, intend to engage in, fish farming, (2) the terms 'farming' shall be deemed to include fish farming."

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Revised FmHA OL loan regulations issued November 29, 1978, provide: "Farm. A tract or tracts of land, improvements, and other appurtenances considered to be farm property which is used or will be used in this production of crops or livestock, including the production of fish under controlled conditions, for sale in sufficient quantities so that the property is recognized as a farm rather than a rural residence * * *."

"Fish. Any aquatic gilled animal commonly known as 'fish', as well as mollusks or crustaceans, (or other invertebrates) produced under controlled conditions (that is, feeding, tending, harvesting, and such other activities as are necessary to properly raise and market the product) in ponds, lakes, streams, or similar holding areas."

4. *Farm Ownership Loans (FO).*—FO loans are made to assist eligible farmer applicants, either individuals, cooperatives, corporations, or partnerships to become owner-operators of family farms, to make efficient use of land, labor, and other resources, to carry on sound and successful operations on the farm, and to enable farm families to have a reasonable standard of living. Many categories of family farmers are eligible for FO loans assistance. However, one objective is to assist limited resource operators, new operators, and low-income operators. FO loans can be made for the purchase and development of real estate.

FO loans are authorized by the Consolidated Farm and Rural Development Act. Therefore, Section 343 of the Act applies to those loans. (See operating loans above.)

Revised FmHA FO loan regulations issued November 29, 1978, provides:

"Farm. A tract or tracts of land, improvements and other appurtenances considered to be farm property which is used or will be used in the production of crops or livestock. This includes the production of aquatic organisms under a controlled or selected environment owned or operated by the applicant or borrower * * *."

"Fish farming. The production of fish, mollusks, or crustaceans (or other invertebrates) under controlled conditions in ponds, lakes, streams, or similar holding areas. This involves feeding, tending, harvesting, and other activities as are necessary to properly raise and market the products."

5. *Soil and Water Loans (SW).*—SW loans are made to assist eligible farmer applicants; either individuals, cooperatives, corporation, or partnerships; to encourage and facilitate the improvement, protection, and proper use of farmland by providing financing for soil conservation, water development, conservation, and use; forestation; drainage of farmland; the establishment and improvement of permanent pasture; pollution abatement and control; and other related measures consistent with all Federal, State, and local environmental quality standards.

SW loans are authorized by the Consolidated Farm and Rural Development Act. Therefore, Section 343 of the Act applies to these loans. (See operating loans above.)

6. *Recreation Loans (RL).*—RL loans are made to assist eligible farmers or ranchers; either individuals, cooperatives, corporations or partnerships; owners or tenants to convert all or a portion of the farm or ranch they own or operate to outdoor income-producing recreation enterprises, which will supplement or supplant farm or ranch income and permit carrying on sound and successful operations.

RL loans are authorized by the Consolidated Farm and Rural Development Act. Therefore, Section 343 of the act applies to these loans. (See operating loans above.)

Revised FmHA RL loan regulation issued November 29, 1978, provides the same definition for "farm" and "fish farming" as do the farm ownership loan regulation. (See above.)

7. *Business and Industrial Loans (B&I).*—B&I loans are made to promote development of business and industry, including aquaculture in cities and towns below 50,000 population, but not in larger cities or in areas adjacent to them where population density is more than 100 persons per square mile. Preference is given to applications for projects in open country, rural communities, and towns of 25,000 and smaller. The primary purpose of B&I loans is to create and maintain employment and improve the economic and environmental climate in rural communities.

B&I loans are authorized by Section 310B of Subtitle A of the Consolidated Farm and Rural Development Act. Section 310B(a) of the Act provides for: "* * * the conservation, development, and utilization of water for aquaculture purposes." And, "As used in this subsection, the term 'aquaculture' means the culture or husbandry of aquatic animals or plants by private industry for commercial purposes including the culture and growing of fish by private industry for the purpose of creating or augmenting publicly owned and regulated stocks of fish."

8. *Resource Conservation and Development Loans (RC&D).*—RC&D loans are made to public agencies and nonprofit corporations in areas that have been designated by the Secretary of Agriculture as resource conservation and development project areas. These loans may be advanced only after an RC&D project plan, developed by sponsors with guidance by the SCS, has been accepted by the Secretary of Agricul-

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ture, and the Secretary has authorized SCS and other USDA agencies to help local organizations carry out measures consistent with the plan. RC&D loans help local people meet their share of project costs. RC&D programs to improve the economy of communities in a project area are based on the conservation, development, and use of natural resources.

RC&D loans are authorized by Title III of the Bankhead-Jones Farm Tenant Act. Section 32(e) of the Act states that one of the purposes is to assist in developing "* * * plans for the conservation, development, and utilization of water for aquaculture purposes;" and it goes on to provide that "* * * as used in this subsection, the term 'aquaculture' means the culture or husbandry of aquatic animals or plants." The RC&D program is proposed to be phased out by the end of fiscal year 1981.

9. *Farm Labor Housing (LH) Loans and Grants.*—LH loans and grants are made to individual farmowners, associations or farmers, State or political subdivisions, or broad-based public or private nonprofit organizations, or nonprofit organizations of farm workers to provide decent, safe, and sanitary housing and related facilities for domestic farm labor. Domestic farm labor includes persons working in aquaculture operations.

Animal and Plant Health Inspection Service (APHIS)

The Animal and Plant Health Inspection Service (APHIS) consists of Veterinary Services and Plant Protection and Quarantine. Veterinary Services activities in aquaculture are as follows:

1. Provide differential diagnoses of infections and toxicological conditions of fish through our facilities at the National Veterinary Services Laboratory, USDA, Ames, Iowa.

2. Provide consultation of field veterinary epidemiologists on a request basis, to local officials, and individual fish preducers in the areas of infections and toxicological conditions.

3. Administration of the Virus-Serum-Toxin Act of 1913 which pertains to biological products developed for fish. Currently Enteric Redmouth Bacterin and Vibrio Anguillarum Bacterin are licensed.

Economic, Statistics, and Cooperatives Service (ESCS)

The Economics, Statistics, and Cooperatives Service (ESCS) responds to requests for information relating to the economics of aquaculture. The most active involvement of ESCS has been in conjunction with the Resource Conservation and Development (RC&D) Program of the U.S. Department of Agriculture. Under that program, ESCS performs economic studies on typical problems encountered in the 184 RC&D project areas in the United States. In addition, the National Economics Division of ESCS has conducted and maintains an interest in marketing studies relating to aquaculture as an element of the U.S. consumer's food purchasing patterns. Although the last published ESCS study relating to the economics of aquaculture was released in May 1973, ESCS maintains an active interest and regularly responds to requests for information on the economics of aquaculture. ESCS is not currently, however, conducting research in the economics of aquaculture.

STATEMENT OF DR. ROBERT E. STEVENS, AQUACULTURE COORDINATOR, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

Mr. Chairman, I am pleased to be here today to discuss aquaculture. As a representative of the Department of the Interior, which houses the largest freshwater and anadromous finfish aquaculture programs in this country, I appreciate your interest in the science.

I will defer to the representative from the Office of Science and Technology Policy to present the overall Administration position on these bills. I will elucidate the important role the Fish and Wildlife Service performs in the advancement of commercial aquaculture.

A sound technological base is the foundation of a successful aquaculture program. Knowledge of fishery biology and culture techniques gained from appropriate research activities will help reduce costs, unlock opportunities for the culture of heretofore untried species, and generally provide greater assurance of economic profit and product quality.

The National Research Council's 1978 report on aquaculture in the United States identified the priority areas of long-term aquaculture research as nutrition and feed technology, genetics, reproduction, health management and production systems. The industry will also be restricted without a timely system of drug clearance, a working knowledge of the environmental effects of aquaculture, and the opportunity to

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consider non-U.S. species as candidates for production. In all of these aspects, the Fish and Wildlife Service is supportive of private aquacultural enterprise.

The Service operates nine laboratories engaged in aquacultural research, including a fish nutrition lab, two disease laboratories, two warm water fish farming experimental stations, a fish genetics laboratory, an exotic species facility, a fish control lab which conducts research necessary for drug clearance, a cool water species research and development laboratory, and an extensive network of fish hatcheries. I have for the record a list of the laboratories with a summary of their research capabilities, and a map showing the locations of our fish hatcheries.

Food costs in aquaculture account for 25 to 80 percent of total production costs, and therefore, every slight improvement in this area will be favorably reflected in the profit column. Two factors are key: delineation of nutritional requirements for efficient growth and the development of cost-effective feeds. In 1932, the Service established the first laboratory in the world devoted exclusively to fish nutrition. Investigations at the Tunison Laboratory at Cortland, New York, succeeded in not only defining the basic nutritional and mineral requirements for cultured fish, but were primarily responsible for the development of dried fish food which revolutionized aquaculture in the United States and abroad. A diet of this type of fish food has proven sufficient to carry such fish as the Atlantic salmon through their entire life cycle and laboratory experts are now using a computer to develop dried food diets for a wide variety of other fish species.

The Service has pioneered in the identification of fish parasites and diseases, as well as preventive treatments, at the National Fishery Research Center in the State of Washington and the National Fish Health Research Laboratory at Leetown, West Virginia. Great strides have been made in the identification of the sources of such fish viruses as infectious pancreatic necrosis. Control of this and other rather common fish diseases will greatly assist commercial producers.

The use of certain drugs for the prevention and control of the common diseases and parasites of cultured fish is essential to the aquaculture industry. These chemical compounds must be registered with the Food and Drug Administration, a process which can entail some $12 million and a minimum of six years of research for initial approval of a drug and upwards of $1 million and three to four years for compounds already registered for another use. This is obviously beyond the means of the individual producer. The majority of the necessary research is performed or coordinated at the Service's National Fishery Research Laboratory in La Crosse, Wisconsin. Two drugs which were cleared for use through Service efforts, sulfamerazine and oxytetracycline, have increased production at our fish hatcheries by twenty percent and are now widely used in commercial aquaculture activities. Many of the chemicals currently being used in aquaculture were developed for agriculture or some other purpose and must be adapted for use in water. The La Crosse facility also has the capability to preduce specific formulations of these chemicals for the aquatic environment.

The La Crosse laboratory has recently been expanded. In addition to their work in clearing chemicals for aquacultural use, the enlarged facility has a "water modeling" capability, allowing us to duplicate any water chemistry, including brackish and saltwater. In this way, we can structure our research to benefit aquaculture all over the world.

The subject of genetics is scarcely mentioned in the field of aquaculture and yet the science dominates the field of agriculture. It would be extremely important, for example, to select genetic characteristics for accelerated growth, resistence to diseases, more efficient feed conversion, and altered spawning seasons to ensure a continuous supply of eggs. The Fish and Wildlife Service operates the Fish Genetics Laboratory at Beulah, Wyoming, where we are involved in studies on the genetics of the rainbow trout. Service scientists there have succeeded in producing a rainbow trout line that is 86 percent larger at one year than ordinary strains. The Experimental Fish Hatchery at Leetown, West Virginia, is being prepared to broaden our genetic research to include studies on other species of fish.

Virtually nothing is known about the potential impact of commercially interesting exotic species of fish on native aquatic plants and animals. The Service's National Fishery Research Laboratory at Gainesville, Florida, will study this question and investigate the proper utilization of exotic finfishes for aquaculture purposes.

The Fish Farming Experimental Station at Stuttgart, Arkansas, is the only Federal laboratory specifically authorized by Congress to aid the commercial freshwater aquaculturist. This lab is charged with the development and improvement of culture of warmwater fish, especially catfish. The Station also provides an effective extension service for warmwater aquaculturalists and fish farmers, including diagnostic

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services in controlling fish diseases and technical assistance in the construction of facilities and in solving production problems.

Emphasis at the Service's Southeast Fish Cultural Laboratory in Alabama is directed toward propagation methods for striped and largemouth bass, and the development and application of cultural methods to investigate the effects of pollutants on warmwater fish species.

In addition to these two fish farming experimental stations, which are completely oriented to the development of freshwater aquaculture practices, the Fish and Wildlife Service administers 88 fish hatcheries producing over 40 species of fish. Additionally, five development centers around the United States coordinate the findings of the various research installations for application to the production problems found at the hatcheries. These centers are presently working in the areas of environmental controls, pollution abatement, diet formulation, quality control, production methods and equipment, and training.

Each hatchery demonstrates to fish farmers and the general public the most up-to-date, tried and tested techniques in fish culture as well as fundamental concepts in biology and conservation. And, at 10 locations across the country, the National Fish Hatchery System has approximately 20 diagnostic specialists who function as fish disease and fish husbandry specialists for Service and State problems and provide assistance to private producers.

The Fish and Wildlife Service also offers advanced training at the Fisheries Academy at Leetown, West Virginia, to educate the public and private sectors in all aspects of aquaculture research and production. The program is continuous and the curriculum is flexible to meet the most urgent needs of the rapidly advancing aquaculture field.

In cooperation with State universities and conservation agencies, the Service operates 25 Cooperative Fishery Units. More than half of these units conduct investigations concerning various aspects of aquaculture. Findings produced through these programs are channeled into the extension services of the States, the Department of Agriculture and Sea Grant.

Fish and Wildlife Service technical research and development efforts on freshwater finfish have and will continue to benefit aquaculturalists, and we intend to press forward vigorously with our work in the field.

The Leetown facility has been expanded into the National Fisheries Center. When renovations are completed, it will be most advanced fishery research, development and training center in the world. The Center administers and interrelates six geographically scattered fish husbandry labs and certain development and training functions to provide a comprehensive aquaculture foundation. The Tunison Laboratory of Fish Nutrition, the Fish Genetics Laboratory, the Fish Farming Experimental Station, and the Southeast Fish Cultural Laboratory are all included under the administration of the Center. We are also near completion of a new facility which will be integrated into Center activities, the National Fishery Research and Development Laboratory at Wellsboro, Pennsylvania. The scientists there will work principally on the culture of coolwater fish and aquaculture engineering techniques. Located within the Leetown complex itself is a new multimillion dollar Eastern Fish Disease Laboratory, renamed the National Fish Health Research Laboratory, the Experimental Hatchery and the Fisheries Academy. The National Fisheries Center has been organized to formulate and disseminate a continual, up-to-date technological base for advancing fish culture practices.

The Service enjoys a national and international reputation in fishery research, especially in the fields of fish nutrition and disease. We are also presently the only Federal Agency with an organized framework of expertise and facilities in freshwater aquaculture. In fiscal year 1979, we spent approximately $25 million on various aquaculture activities; $5.7 million of which was used for research. We believe that resources invested in our aquaculture effort have and will continue to produce timely and effective results.

However, we do realize that our Service does not possess all the expertise or all the facilities necessary to resolve the multifaceted problems of aquaculture. These problems should be attacked on a broad front by all interests concerned, but duplication of effort should be avoided.

To this end, the Department of the Interior is negotiating a Memorandum of Understanding with the Departments of Commerce and Agriculture to formally define responsibilities. In addition, the Joint Subcommittee on Aquaculture under the Federal Coordinating Council for Science, Engineering and Technology, composed of 13 government agencies, has made considerable progress in fostering coordination. The Subcommittee has set up a task force to develop an aquaculture plan to facilitate future Federal and private aquaculture efforts. The Fish and

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Wildlife Service is providing technical and policy staff in the preparation of this document, scheduled to be completed shortly. In addition, the Fish and Wildlife Service contracted for a study to identify and catalogue State, Federal, and local regulations affecting commercial aquaculture. This contract was funded by contributions for eight Federal agencies as a project of the Joint Subcommittee on aquaculture.

Mr. Chairman, this concludes my prepared testimony. If you or the Committee members have any questions, I would be pleased to answer them.

FISH AND WILDLIFE SERVICE LABORATORIES ENGAGED IN AQUACULTURE RESEARCH

National Fisheries Center, Leetown, West Virginia—administers and interrelates six geographically scattered fish husbandry research and training activities of the Service into a comprehensive and flexible program.

National Fish Health Research Laboratory, Leetown, West Virginia—disease identification, control and treatment; field evaluation of techniques; also site of Experimental Hatchery and Fisheries Academy.

Tunison Laboratory of Fish Nutrition, Cortland, New York—basic nutritional requirements; practical and least costly diet formulations; assessment of diet efficiency; nutritional energetics; also provides extension services.

Fish Farming Experimental Station, Stuttgart, Arkansas—disease diagnostics; nutrition; water reuse and purification; drug testing; also provides extension services.

Southeast Fish Cultural Laboratory, Marion, Alabama—culture methods for warmwater fishes; environmentally controlled intensive culture systems; environmental contaminants; also provides extension services.

Fish Genetics Laboratory, Beulah, Wyoming—strain characteristics of rainbow trout; breeding and selection methodology.

National Fishery Research and Development Laboratory, Wellsboro, Pennsylvania—reproductive physiology of coolwater fishes; cultural methodology of coolwater fishes; engineering design of cultural systems.

National Fishery Research Laboratory, La Crosse, Wisconsin—clearance of chemicals and drugs used in aquaculture.

National Fishery Research Laboratory, Gainesville, Florida—exotic fishes in relationship to the environment with a view towards culture of selected species.

National Fishery Research Center, Seattle, Washington—disease diagnostics; diseases of fishes in the wild; increased survival of hatchery stocked fishes.

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STATEMENT OF DAVID H. WALLACE, DIRECTOR, OFFICE OF INTERNATIONAL FISHERIES AFFAIRS, NATIONAL MARINE FISHERIES SERVICE, U.S. DEPARTMENT OF COMMERCE

Mr. Chairman and Members of the Committees, I welcome the opportunity to appear this morning to comment on S. 1650, the National Aquaculture Act of 1979, and S. 1408, the National Aquaculture Organic Act of 1979. I am here today not only representing the Department of Commerce, but also speaking in my capacity as Chairman of the Joint Subcommittee on Aquaculture of the President's Federal Coordinating Council on Science, Engineering, and Technology. With me, Mr. Chairman, is Dr. Tapan Bonerjee, the NOAA Aquaculture Coordinator and the Executive Secretary of the Joint Subcommittee on Aquaculture who is also available to respond to your questions.

First, I will discuss S. 1650. This bill provides for the Secretaries of Agriculture, Commerce, and the Interior, to develop a National Aquaculture Development Plan in consultation with other appropriate Federal agencies, State agencies, and any appropriate Regional Fishery Management Council. All three Secretaries would be responsible for implementing any program under the plan that comes under their respective jurisdiction. A Joint Subcommittee on Aquaculture of the Federal Coordinating Council on Science, Engineering, and Technology would be established, consisting of the three Secretaries and representatives of nine other Federal agencies. The Subcommittee's purpose would be to increase the overall effectiveness and productivity of Federal aquaculture research, transfer, and assistance programs and to ensure that all Federal agencies involved with aquaculture are carrying out their activities in a manner consistent with the purposes of the Act. The Chairman of the Joint Subcommittee on Aquaculture would serve a term of 2 years and would be selected by mutual agreement of the chairmen of the sponsoring committees (the Committee on Atmosphere and Oceans and the Committee on Food and Renewable Resources) of the Federal Council. A biennial report on the status of aquaculture in the United States would be submitted to the Congress by the Joint Subcommittee on Aquaculture starting September 30, 1981.

The three Secretaries would be authorized to make grants, or contracts with, any person, any other Federal department or agency, any State agency, or any regional commission for implementing the Plan.

Provisions of the bill would also require the three Secretaries through the Joint Subcommittee on Aquaculture, to conduct a study of the capital requirements of the U.S. aquaculture industry, and a study of the State and Federal regulatory restrictions to aquaculture development in this country. Based on the results of these studies, the Secretaries shall formulate a plan for acting on the findings. These plans shall be submitted to Congress.

Mr. Chairman, we are pleased to support S. 1650. This proposed legislation reflects the concerns of the President expressed when he decided against approval of H.R. 9370 and is designed to ensure that Federal programs and policies related to aquaculture fulfill their potential for supplying food, employment, and recreation and contribute to the nation's economy.

Many of the requirements of the bill have already begun to be implemented through the activities of the Joint Subcommittee on Aquaculture (JSA) established by Executive action. A task force operating under the auspices of the JSA has been working diligently for the past 6 months to prepare a first draft of a National Aquaculture Plan. The Plan includes an approach to resolve the problems confronting 12 major species currently in development: baitfish, catfish, clams, crawfish, large-mouth bass, mussels, oysters, prawns, salmon, shrimp, striped bass, and trout. The plan identifies areas where over a 5-year period particular programs of research, development and other activities were required. It identifies funding and personnel needs, and what agency or agencies should be responsible for carrying out these programs. Other species showing future potential were also identified. In early September, this preliminary draft was reviewed at a workshop held in Washington, D.C., by almost 200 members of the aquaculture community. Attendees included representatives of industry, academia, State and Federal agencies, and Congressional staff members. The JSA task force is currently in the process of evaluating the comments and suggestions submitted at the workshop and preparing a new draft of the plan. This draft will then be made available for general public scrutiny before being finalized by the JSA agencies. We foresee the Plan as a dynamic document, with necessary changes, additions, and deletions made as needed to reflect the needs of public/private aquaculture requirements.

In addition, through the JSA, two studies were contracted in September of 1979 to determine the capital requirements of the U.S. aquaculture industry and any regulatory constraints to aquaculture development. The study on capital requirements is being financed by the NMFS, and the study on regulatory constraints is under the

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sponsorship of the Fish and Wildlife Service and supported by several agencies of the JSA. It is expected that the results of these studies will be available in the fall of 1980. We will bring the results of these studies to Congress and recommend steps the Federal Government should take to solve the problems identified.

It is our view that the establishment of the interagency coordination mechanism, and the development of the national aquaculture plan as required by S. 1650 provide the basis for sound Federal participation in aquaculture activities. Furthermore, when the two studies mentioned above are completed, we anticipate that we will be in a better position to address adequately the requirements for aquaculture development in the United States.

The second bill under consideration is S. 1408 and is similar to H.R. 20 which we opposed last April and H.R. 9370, passed by the Congress last year. In the President's veto message on H.R. 9370 of the 95th Congress, he expressed concern over major new government subsidies such as the loan guarantee and insurance programs, until a clear need for them is established. The Administration position on this issue remains the same. We are therefore opposed to S. 1408 in its present form.

In summary, Mr. Chairman, our Department attaches considerable importance to the development of U.S. aquaculture. Through the JSA, we have been working with the President's Office of Science and Technology Policy on this important matter, and are looking forward to continuing to expand our efforts within the parameters established in S. 1650.

Mr. Chairman, this concludes my prepared statement. I will be happy to answer any questions the Committees may wish to ask.

STATEMENT OF JAMES THORNTON, ASSOCIATE ADMINISTRATOR, FARMERS HOME ADMINISTRATION, U.S. DEPARTMENT OF AGRICULTURE

Mr. Chairman and Members of the Committee, I welcome this opportunity to appear before you to comment on the Farmers Home Administration's (FmHA) role in Aquaculture. As has already been stated by Bille Hougart, the Department of Agriculture's Aquaculture Coordinator, the Department opposes S. 1408 and strongly supports the enactment of S. 1650, The National Aquaculture Act of 1979. Mr. Hougart has presented the reasons for our support of this bill, and I will therefore comment on the Farmers Home Administration's role in financing aquaculture.

The Farmers Home Administration presently extends credit to aquaculture operators, farmers, ranchers, rural residents, and communities. This agency helps borrowers gain maximum benefit from loans through counseling and technical assistance. Our loan programs serve a broad range of applicants, including individuals, partnerships, cooperatives, corporations and public bodies.

Aquaculture operators have nine existing FmHA credit programs they can utilize for financial assistance. These programs are described in an FmHA fact sheet, "Aquaculture Loans," which I have brought to this hearing. This fact sheet has been distributed to FmHA field offices and other Federal agencies. I would now like to briefly detail these programs and their application for aquaculture operations.

As you know, our agency provides a variety of programs to assist those engaged in agriculture, including aquaculture operators. The Farm Ownership and Operating loan programs assist family farmers who become established in fish-farming. The emergency loan program aids aquaculture operators with severe disaster losses while economic emergency loans are available to those suffering economic hardships due to a general lack of credit or area-wide economic stress. Soil and water loans can finance land and water development for fish-farming, and recreational loans assist eligible farmers in developing outdoor income-producing enterprises such as ponds for fee-fishing. In addition, business and industrial loans can be made to finance aquaculture related businesses such as seafood production, processing plants, and fishing vessels.

Public agencies and nonprofit corporations in designated areas can receive resource conservation and development (RC&D) loans to help local people meet their share of Soil Conservation Service RC&D project costs. These loans can be made for planning and development of the conservation and utilization of water for aquaculture purposes. Finally, farm labor housing loans and grants to individuals or groups can be used to finance housing for domestic labor involved in aquaculture operations.

Our present reporting system does not delineate loans made for aquaculture purposes within the various loan programs. The information we have for you today was compiled from a telephone survey of our State offices.

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We have approximately 363 loans for over $15 million to fish farmers and aquaculture operators for development production and disaster-related purposes within farmer programs. Seventeen business and industry loans for aquaculture purposes have been closed for $23.1 million, and 5 applications are pending for $9 million.

Mr. Chairman, several factors have limited our activity in this area. To be economically viable, an aquaculture or fish farming operation must produce an aquatic product at a competitive cost and be able to sell the product at a reasonable profit. It will take some time for basic research to develop the necessary technology and for such technology to be widely adopted by the industry. Furthermore, new markets have to be developed and in some cases consumer acceptance must be generated. Clearly, many unanswered questions remain.

Thus, in October 1978, President Carter [pocket] vetoed H.R. 9370. The President's primary reason for this action was his belief that the need for the financial assistance and demonstration programs proposed has not been adequately demonstrated.

Over the past several months, White House and Federal agency staffs, including FmHA, have explored Federal and non-Federal financial assistance for aquaculture. Although the financial risks involved in aquaculture, particularly marine aquaculture, are recognized, there is a range of opinion on the availability of sufficient private capital, the adequacy of current Federal financial assistance programs, and the need for new Federal programs.

In order to obtain more information, the Joint Subcommittee on Aquaculture has established a Panel on Management and Finance which is chaired by the Farmers Home Administration member of the Subcommittee and has contracted, with financial support provided by the Department of Commerce, for an external study of this program. The National Aquaculture Act of 1979 recognizes the need for this study, which the Wharton Applied Research Center of the University of Pennsylvania will conduct. The results, expected in late 1980, will indicate the degree to which the growth and development of commercial aquaculture in the United States is being impeded by the lack of sufficient venture capital, disaster loans, and insurance. Data obtained will allow a better assessment of the adequacy of current Federal and non-Federal assistance. After this financial assistance study is completed a better understanding will be available of the needs for existing or potential new Federal programs.

Mr. Chairman, we are committed to meet our goal of support for the aquaculture operator. Our agency is active on the USDA Aquaculture Work Group and with the Joint Subcommittee on Aquaculture. We assisted the National Research Council in preparing their recent report "The Role of the U.S. Department of Agriculture in Aquaculture," and in preparation of the "USDA Aquaculture Plan" and "The National Aquaculture Plan".

If enacted, this bill will mandate a National Aquaculture Development Plan with specific recommendations covering every aspect of aquaculture.

This plan will be useful to all federal agencies including FmHA who are involved in aquaculture. For the first time, we will have a comprehensive source of the most up to date information in this complex field, ensuring the most effective use of any Federal Funds.

FmHA will continue our active participation and will assist to the fullest extent in the National Aquaculture Development Plan.

Mr. Chairman, that concludes my prepared remarks, and I will be glad to answer any questions you may have.

FARMERS HOME ADMINISTRATION—FISH FARMING AND AQUACULTURE LOANS

	Number	Amount
Alabama	7	$420,430
Arkansas	11	573,370
California	6	569,320
Colorado	1	36,000
Florida	50	3,424,270
Georgia	4	171,940
Idaho	2	105,984
Illinois	1	161,000
Kentucky	7	153,720
Louisiana	156	810,000
Maine	34	670,000
Maryland	1	41,860
Michigan	7	353,000

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FARMERS HOME ADMINISTRATION—FISH FARMING AND AQUACULTURE LOANS—Continued

	Number	Amount
Minnesota	2	$100,000
Mississippi	28	5,617,695
Montana	5	182,200
New Jersey	2	36,400
New York	1	80,000
North Carolina	6	254,160
Ohio	1	12,500
Oklahoma	15	423,770
Oregon	2	51,000
Pennsylvania	1	45,000
South Dakota	2	43,940
Texas	3	137,490
Utah	3	186,500
Virginia	1	78,000
Washington	4	374,800
U.S. total	363	15,114,349

Note.—These loans were made for production, development and/or disaster related purposes.

FARMERS HOME ADMINISTRATION—BUSINESS AND INDUSTRIAL GUARANTEED LOANS FOR AQUACULTURE AND AQUACULTURE-RELATED ENTERPRISES [1]

[Loans Obligated or Closed]

State	Number of loans	Amount
Alabama	1	$1,865,000
California	1	805,000
Louisiana	2	1,208,980
Maine	2	465,000
Montana	1	900,000
New Jersey	2	650,000
North Carolina	1	115,000
Texas	1	3,780,000
Alaska	4	12,192,000
Puerto Rico	1	940,000
Virgin Islands	1	180,000

[1] Farm ownership, operating, soil and water, emergency, and economic emergency loans.

PREAPPLICATIONS AND APPLICATIONS PENDING APPROVAL

State	Loans	Amount
Mississippi	2	$4,300,000
New Hampshire	1	750,000
Alaska	2	4,000,000

Notes—
(1) Aquaculture loans must meet same regular credit requirements as all B. & I. loans, there are no separate standards.
(2) B. & I. regulations were amended to include aquaculture effective December 1978 as a result of the 1977 Agriculture Credit Act of 1977.

Statement of C. K. Cardwell, Deputy Governor for Supervision, Farm Credit Administration

Mr. Chairman and members of the Subcommittees on Agricultural Research and General Legislation, and Merchant Marine and Tourism.

My name is C. K. Cardwell. I am the Deputy Governor for Supervision at the Farm Credit Administration. The Farm Credit Administration is the independent

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Federal Agency which regulates and supervises the cooperatively-owned lending institutions which comprise the Farm Credit System.

Mr. Chairman, I am not here to pronounce the official views of FCA, or the System it supervises, on the bills pending before your committee. Instead, I am here today to share with you some of the experiences the Agency and System have had in the aquaculture industry. But, before dealing with the System's involvement in this specific area, I would first like to provide a brief overview of the Farm Credit System as a whole.

FARM CREDIT SYSTEM

The cooperative Farm Credit System operates under authorities contained in the Farm Credit Act of 1971 as amended to provide credit and closely related services to farmers, ranchers, producers and harvesters of aquatic products, agricultural and aquatic cooperatives, rural homeowners, and certain businesses providing farmers with services essential to their on-farm operating needs.

To fulfill these purposes, the country is divided into 12 Farm Credit Districts. At the same location in each district, there is a Federal land bank, a Federal intermediate credit bank, and a bank for cooperatives. There is also a Central Bank for Cooperatives in Denver, Colorado.

Federal Land Banks—Federal Land Bank Associations.—The Federal land banks make mortgage loans with terms of from 5 to 40 years through 534 Federal land bank associations. Loans are made for literally any purpose for which the owner of farm or aquaculture property would constructively borrow long-term credit. A first mortgage is required on farm real estate as security for these loans. Limited authority exists to provide mortgage credit to farm-related businesses and rural homeowners.

Federal Intermediate Credit Banks—Production Credit Associations.—The Federal intermediate credit banks provide loan funds to 429 production credit associations and discount notes of eligible borrowers given to certain other institutions financing agricultural producers. Production credit associations make loans with terms of up to 7 years to farmers, ranchers, producers and harvesters of aquatic products, rural homeowners, and certain farm-related businesses. Loans are made for a variety of purposes, including operating needs, refinancing and capital purchases related to the production of agricultural products, the production and harvesting of aquatic products, and other requirements of borrowers. There is limited authority for lending to rural homeowners and farm-related businesses.

Banks for cooperatives.—The 12 district banks for cooperatives serve marketing, supply, and business service cooperatives whose headquarters are within their respective territories. The banks provide these cooperatives with a complete credit service designed to fill their specialized needs. A Central Bank for Cooperatives participates with the district banks in making loans which exceed a district bank's lending capacity.

In sum total, the System seeks to further the objective, stated in the Farm Credit Act of 1971, of "improving the income and well-being of American farmers and ranchers." It should be noted that System efforts to realize this objective are made at no cost to the taxpayer. Even the operating cost of the Farm Credit Administration is assessed to the users of the System. Loan funds are procured by sale of bonds and debt instruments to the public which carry no Government guarantee. During the past calendar year, the System, through the sale of securities, was able to obtain nearly $68 billion in loan funds in this manner.

FARM CREDIT'S ROLE IN FINANCING AQUACULTURE

Aquaculture has long played a role in Farm Credit lending, albeit a relatively modest one. The System considers aquaculture to be simply one of many forms of agriculture. In fact, because of this, figures do not exist on the exact number or amount of loans outstanding to borrowers engaged in aquaculture. Our institutions, that is to say, do not normally segregate aquaculture from other types of agricultural loans in their financial reports. However, in response to congressional interest on this subject we have requested Farm Credit System banks to estimate the extent of aquaculture financing in their districts. The banks estimate that approximately $37 million was loaned this year to aquaculturists by Farm Credit System institutions.

A question which might be asked at this juncture is, why does the Farm Credit System make such a relatively small proportion of its loans to aquaculture? At one level there are perhaps as many different answers to this question as there are

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types of aquaculture. But, for the industry as a whole, several broad generalizations can be made:

1. *Credit worthiness.*—Aquaculture has been and remains a specialized business. Supply and demand has been such that profit margins are frequently both thin and unstable. Being a specialized operation with less economic stability than is found in agriculture generally, the risk factor is greater. Farm Credit institutions are user-owned and must absorb any losses which occur. Accordingly, the equity, collateral, and operating characteristics are examined more critically in determining credit worthiness. This is a logical and sound business approach.

2. *Lending experience.*—Early ventures by the System in aquaculture financing were predominately in the shellfish area—principally oysters. Many of these operations were conducted in State-owned leased waters. Opportunity to service and control such loans presented problems for land-oriented lenders. Uncontrollable weather and disease often produced hazards against which normal lending standards were inadequate. Problems and losses were experienced at times which made continued financing unattractive.

The advent of catfish and similar types of more controllable aquaculture operations has produced more favorable financing results. Many of these are part of an integral general farming operation, which modifies the risk. Feed conversion ratios are good and management "know-how" is improving. The principal limiting factor has been economic. Sufficient demand, which creates a market price that would make the rate of return attractive, would undoubtedly stimulate expansion. System financing would generally be available to qualified borrowers. Consistent with the standards maintained in general agricultural lending, the System cannot provide credit to aquaculture producers who fail to meet normal commercial standards for credit worthiness.

3. *Aquaculture development.*—Agriculture in general has benefited from extensive mechanical and technological advances provided by both Government and those who sell to and purchase from the producer. In comparison, aquaculture has received minimal benefits of this nature. Thus, the business environment surrounding aquaculture is less attractive than for agriculture as a whole. Furthermore, the open seas capture fishing industry for many years provided a substantial supply of fishery products, creating heavy competition which dampened aquaculture interests.

At this point, I would like to clarify that the System finances both aquaculture and the open seas capture fishing operations. The Farm Credit Act of 1971 established the initial authority for open seas fishery loans and a subsequent amendment in 1978 extended the term limitations to 15 years on deserving capital credit loans. The System adopted a cautious approach to aquatic lending in the early '70s. There were some rough spots in acquiring the credit expertise needed to analyze and service such loans. Becoming conversant with marine law and insurance in order to properly handle this substantially different collateral situation was also a challenge. Some mistakes were made, but in total, the experience to date has been good. As of September 30, 1979, there were over 2,400 loans outstanding for in excess of $238 million. About two-thirds of this amount is off the West Coast, nearly one-third is on the East Coast, and only a relatively modest amount is in the Gulf area. Activity in this phase of the System's lending is increasing, attributable in part to the expanded term authority provided by Congress last year. It is expected that loans to commercial fishermen will continue to increase in number and amount, especially if the three aquatic proposals in S. 1465 are enacted into law.

THE FUTURE FINANCING NEEDS OF AMERICAN AQUACULTURE

Based upon observations made from the System's exposure in aquatic lending, it would appear that increased demand and a potentially smaller supply of capture fishery products in relation to demand are causing prices at the consumer level to increase. When this produces the potential for a profitable rate of return on investment and labor, production will expand. The Farm Credit System will be responsive to the credit needs of deserving applicants. This will be on a practical businesslike approach on the same basis as agricultural loans are made.

Mr. Chairman, these views are the highlights of the issue as we see them. The proposed legislation would provide some of the incentive which could facilitate expansion of aquaculture. A word of caution, though—any Government effort should be approached cautiously and carefully so as to not upset the balance in the existing fisheries industry and in the normal agricultural production areas. Also, I believe that stimulation should be possible through support to the private sector operating in these areas with a minimal of direct Government involvement. I will be pleased to answer any questions.

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STATEMENT OF HAROLD A. THEISTE, ASSOCIATE DEPUTY ADMINISTRATOR FOR PROGRAMS, U.S. SMALL BUSINESS ADMINISTRATION

Thank you for this opportunity to share with you the Small Business Administration's comments concerning our involvement in aquaculture as well as some general comments concerning S. 1650.

The Administration, which of course includes SBA, supports S. 1650. SBA recognizes that a viable aquaculture industry can make a significant contribution to our Nation's total food production while at the same time, help to reduce our balance of trade deficit.

As the Committees realize, SBA's involvement in aquaculture began with the enactment of Pub. L. 94-305 in June of 1976. Prior to the enactment of this law SBA did not make agricultural loans which were then the responsibility of the Agriculture Department and the Farm Credit Administration. Only under exceptional circumstances, when FmHA refused assistance, SBA did make a very few aquaculture loans. However, since the passage of Pub. L. 94-305 SBA offers its full range of assistance (financial, management, technical, etc., and disaster) to those qualifying in the aquaculture field.

It is difficult for SBA to produce reliable statistics on the number of aquaculture loans, because the Standard Industrial Classification system used through the Government carries only a general code for "animal specialties not elsewhere classified." It is possible that some SBA aquaculture loans are coded also under farm activities. A table setting forth our approved loans for fiscal years 1977 and 1978 is submitted. Unfortunately, data for fiscal year 1979 is not yet available. The Agency does not maintain statistics on loan inquiries or declines. Our loan approval statistics should be improved upon the establishment of an SIC code for aquaculture which has been requested of the Department of Commerce.

While direct SBA dollars have long been limited, the Agency has substantial loan guaranty authority, over $3 billion for fiscal year 1980, and has been basically a guaranteeing agency in recent years. Any eligible lender submitting the application of a small creditworthy aquaculture concern gets sympathetic attention for we realize the importance of this business activity.

The limitations on the SBA loan guaranty program appear generous for small firms in aquaculture. $500,000 can be guaranteed for as long as 10 to 20 years if that amount does not exceed 90 percent of the loan.

SBA's involvement with aquaculture goes beyond our ability to make loans and provide technical assistance. In the spring of 1978, SBA was invited to be an agency observer at the National Advisory Council on Oceans and Atmosphere. SBA was requested in the fall of 1978 to participate in the Interagency Task Force on Aquaculture. In January of 1979, this task force became part of the Federal Coordinating Committee for Science, Engineering, and Technology (FCCSET) under the direction of Presidential Advisor Frank Press. As a result of SBA's participation in FCCSET, the Agency is currently participating in the Seafood Industrial Directory, Fisheries Development Task Force, and the National Aquaculture Plan.

Recently SBA informally agreed to participate jointly with Commerce in providing whatever support and assistance we can to the saltwater aquaculture industry. The Department of Agriculture has agreed to assist the fresh water aquaculture wherever possible, including the funding of small firms.

S. 1650 will declare a national policy for aquaculture; it will establish and implement a national aquaculture development plan; and it will encourage aquaculture activities and programs in both the public and private sectors of our economy.

I feel confident that through the work of your Committees and the active participation of the necessary agencies in Government, the aquaculture industry will shortly become a viable partner in America's food production. SBA looks forward to being a partner in this endeavor.

This concludes my prepared statement. I will be happy to answer any questions you may have.

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ENCLOSURE.—SBA REGIONAL LOAN COMPOSITE FOR FISHERIES AND AQUACULTURE

Office location code and location	Loan types		Total		Standard industrial classification codes				
	Guaranty	Direct	Number	Dollars	Miscellaneous farms 0279	Fin fish 0912	Shell fish 0912	Miscellaneous marine 0919	Fish hatcheries 0921
0100 Boston region	78	19	97	6,468,146	1	23	73		
0200 New York region	5	4	9	296,000	5	4			
0300 Philadelphia region	7	2	9	492,100	3	1	5		
0400 Atlanta region	32	25	57	1,953,230	15	11	30		1
0500 Chicago region	5	2	7	229,000	7				
0600 Dallas region	25	26	51	2,513,000	12		38		
0700 Kansas City region	24	5	29	1,009,200	29				
0800 Denver region	9	1	10	520,500	10				
0900 San Francisco region	12	12	24	830,300	9	9	3	2	1
1000 Seattle region	36	110	146	5,349,918	11	126	7		2
Totals	233	206	439	19,661,394	103	174	156	2	4
Aquaculture loans:									
All regions	18	7	25	1,490,500					

Statement of Kenneth Ellis, U.S. Trout Farmers Association

Mr. Chairman and Members of the Joint Committee, my name is Kenneth Ellis. I am President of the United States Trout Farmers Association, which encompasses approximately 95 percent of the commercial trout raised in the United States today.

I live in the beautiful Magic Valley area of southern Idaho. My hometown, Buhl, Idaho, is known as the trout capital of the world. I raise commercial trout for sale throughout the United States and foreign countries.

We, within this industry, are well aware that we are only a fledgling within the total aqua-agricultural community. Nevertheless, we are not a new breed of farmers. History indicates that aquaculture farming and harvesting (in controlled and noncontrolled aquatic environments) is thousands of years old, yet it has been only within the past two decades that our industry has been recognized as an additional viable and essential food producer.

My written and oral testimony at this time will be directed at Senate bill 1650. We are appreciative of the time allotted to us to testify. We do have testimony on Senate bill 1408 and we will submit that in writing before the established deadline.

We are pleased that after many years of hard work by both the United States Senate and the United States House of Representatives to come up with a National Aquaculture Act, Senate bill 1650 finally approaches what all of us consider to be a viable bill. However, there are some areas in the bill which we, in the private trout industry, would like to see addressed before this bill is completed in its final form.

Our comments will be brief as they will be for clarification or minor additions to the bill.

In findings, the bill addresses "the principal responsibility for the development of aquaculture in the United States must lay with the private sector." This we find is in contradiction with the balance of the bill as it appears the private sector has been left out or put in a minority position in the decisionmaking process in the bill as a whole.

In general, we feel that the United States trout industry and other viable aquaculture organizations in the private sector should contribute substantially to the development of the plan as outlined on page 6 paragraph 2.

The Plan states that the Secretaries may appoint an advisory committee to assist in the initial development of the Plan. We feel that the Secretaries should be required to appoint an advisory committee comprised largely of knowledgable people from the private sector of the aquaculture industry to assist in the development of this Plan.

In the contents of the Plan regarding the identification of the species that have significant potential for culturing on a commercial or other basis, the wording should be "the Secretaries and their advisory committee" instead of just "the Secretaries." In the balance of the bill wherever the term "Secretaries" is used, the term "the Secretaries and their advisory committee" should be inserted.

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Through the continuing aquaculture assessment the Secretaries should not limit themselves to potential industries that are not now being developed but they should concentrate their efforts to already proven industries that have more potential development.

Under Mandatory Functions, the Secretaries should require that any of the programs or projects to be initiated be required to prove economic feasibility and that limits be set for each program so that only few programs do not deplete appropriated funds.

In summary, we cannot emphasize too strongly our feelings of the many positive aspects of the bill, including but not limited to the following: Capital Requirements Study—too many times aquaculture is classified as a special type loan by potential lenders subject to escalated interest rates two to three percent above normal rates. These studies should, through recognition alone, alleviate many of these problems; Coordination of National Activities—positive cooperation by the designated joint subcommittee on aquaculture can expedite the time consuming procedure of review by the various Federal agencies; Authorization of Appropriations—we feel that by leaving this open-ended until such time as the definite needs are established is very positive. Trying to set appropriations before the definite needs are established is very premature.

I could expand into other areas of the bill but I believe, for the most part, the balance of the bill is positive. Time is of the essence due to aquaculture's part in the imbalance of trade in the world markets so we believe that every effort should be made to shorten any of the established timetables within the bill.

We, of the trout industry, appreciate the opportunity to testify before this joint committee.

Thank you.

STATEMENT OF DAVE PEARCE, BROWNS, ALA.

I am Dave Pearce, a catfish farmer from Browns, Alabama. I have a 160 acre catfish farm and am the current president of Catfish Farmers of America. I am here today to testify on Senate Bills 1650 and 1408.

I want to thank all the members of the committee and their staff for all the work that they have been doing on the aquaculture legislative proposals that have been introduced since 1975. We in the catfish farming industry, with which all of you are well acquainted, are greatly appreciative of the interest in the development of aquaculture in this country, and know from my experience of dealing with the Land Grant Universities and the U.S. Department of Agriculture that the government has an appropriate role to play in the development of the aquaculture industry.

We have reviewed carefully the two pieces of legislation, Senate Bill 1650 and 1408 and feel that Senate Bill 1650 is the correct approach to developing the aquaculture industry. The Bill provides the needed support for the industry and gives the appropriate authorities to the programs already underway. At this time, we do not need any new programs, but rather we need to make a careful evaluation of the needs of the industry and then, if action is needed, to proceed according to a well prepared plan. Senate Bill 1650 represents, in our opinion, the fruition of years of careful study and deliberation on just how the government should proceed in playing the appropriate role in the future of aquaculture.

Our position on the legislations have been carefully enumerated in the last four years and I do not, at this time, feel that any further statements from us are necessary. We support 1650 and urge its passage and implementation into law.

Thank you for the opportunity to testify.

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96TH CONGRESS
1ST SESSION

S. 1408

To provide for the development of aquaculture in the United States, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JUNE 25 (legislative day, JUNE 21), 1979

Mr. WEICKER (for himself, Mr. GRAVEL, and Mr. DURKIN) introduced the following bill; which was read twice and referred jointly, by unanimous consent, to the Committees on Agriculture, Nutrition, and Forestry and Commerce, Science, and Transportation

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A BILL

To provide for the development of aquaculture in the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Aquaculture Organic Act of 1979".

SEC. 2. FINDINGS, PURPOSE, AND POLICY.

(a) FINDINGS.—Congress finds the following:

(1) The world consumption of seafood is increasing and the harvest of some populations of fish and

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shellfish has exceeded levels of maximum sustainable yield.

(2) Certain stocks of fish and shellfish of importance to the United States are depleted, or are declining, and such depletion or decline has an undesirable impact on both commercial and recreational fisheries.

(3) There is an extensive market for seafood in the United States, but the United States imports in excess of 50 percent of its fish and shellfish for human consumption (which imports are 10 times the level of exports), and this dependence on imports as a source of protein makes it difficult to insure continuous supplies and suggests that alternatives such as aquaculture be developed.

(4) Many segments of the world population are now facing serious nutritional deficiencies and food shortages due to adverse climatic conditions and the steady growth of population. These problems will become more severe, and the resulting demand for increased food production will have to be met chiefly through the application of scientific and technological advances from research on aquaculture and other food production systems.

(5) Aquaculture is contributing significantly to world food supplies with production equal to 10 per-

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cent of current landings of seafoods and has the potential for increase by a factor of five before the end of the century.

(6) Less than 3 percent of current United States fisheries production results from aquaculture but there is a good potential for expanding production from aquaculture to equal or exceed the worldwide average, thereby helping to provide United States consumers with stable supplies of high quality aquatic foods.

(7) The stocking of advanced life stages of fish and shellfish produced by aquaculture to the natural environment is a possible means of rebuilding and augmenting fish and shellfish populations and establishing new fisheries.

(8) The application of aquaculture technology offers opportunities for recovery of thermal energy, nutrients, and other resources normally wasted and may be a more efficient use of these resources for food production than current methods of agriculture.

(9) Water, whether fresh, brackish, or marine, which is suitable for aquaculture is diminishing or in many cases is underutilized.

(10) Many areas of the United States are suitable for aquaculture, but are subject to land-use or water-use management policies that may inhibit the develop-

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ment of aquaculture. These policies should be reviewed and modified so that aquaculture will be considered along with the other possible uses of such areas.

(11) Current efforts to develop aquaculture in the United States are highly diffuse, and a strong commitment by the Federal Government will make aquaculture more efficient and competitive, thereby stimulating public and private investment and development.

(12) While many scientific and technological problems are unsolved, there is sufficient knowledge to further the development of aquaculture production systems for some species of fish and shellfish.

(13) The development of aquaculture in the United States has been limited by the inability of producers of aquatic species to obtain adequate capital and a reliable source of seed stock.

(14) Aquaculture in the United States has traditionally concentrated on a few aquatic species, but many others have a potential for commercial and other culture.

(15) Government programs that help to reduce the risks associated with production of agricultural commodities have not been generally available to producers of those aquatic species in which the risk is high.

56-308 O - 80 - 8

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(16) The rehabilitation and enhancement of fish and shellfish resources are desirable applications of aquacultural technology.

(b) PURPOSE.—The purpose of this Act is to promote aquaculture in the United States by—

(1) declaring a national aquaculture policy;

(2) establishing and implementing a national plan for aquaculture; and

(3) developing programs and encouraging activities;

which will result in the coordination of domestic aquaculture efforts, the conservation, rehabilitation, and enhancement of fisheries resources, the creation of new industries and job opportunities, and other national benefits.

(c) POLICY.—Aquaculture has a high potential for augmenting existing commercial and sport fisheries, thereby increasing the supply of aquatic protein for both human and animal consumption and assisting the United States in meeting its future food needs and contributing to the solution of world food problems. It is, therefore, in the national interest, and it is the national policy, to encourage the development of aquaculture.

SEC. 3. DEFINITIONS.

As used in this Act:

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(1) The term "aquaculture" means the propagation and rearing of aquatic species in controlled or selected environments, including ocean ranching.

(2) The term "aquaculture facility" means any dry or submerged land, floating or fixed structure, or other appurtenance, if such land, structure, and appurtenance is located within the United States, which is used for aquaculture, including, but not limited to, any laboratory, hatchery, rearing pond, raceway, pen, incubator, or other equipment, including vessels in support of aquaculture.

(3) The term "aquatic species" means any species, native or introduced, of finfish, mollusk or crustacean or other aquatic invertebrate, amphibian, reptile, or aquatic plant, but does not mean any species of finfish or aquatic plant primarily used for ornamental purposes.

(4) The term "fund" means the Federal Aquaculture Assistance Fund established by section 11.

(5) The term "person" means any individual who is a citizen or national of the United States and any corporation, partnership, association, or other entity (including, but not limited to, any community development corporation or fishermen's cooperative) organized or existing under the laws of any State.

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(6) The term "Council" means the National Aquaculture Council established by section 4.

(7) The term "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands, Guam, the Trust Territory of the Pacific Islands, and any other Commonwealth, territory, or possession of the United States.

(8) The term "United States", when used in a geographical context, means all States including the adjacent fisheries economic zone.

SEC. 4. NATIONAL AQUACULTURE COUNCIL.

(a) ESTABLISHMENT.—There is established the National Aquaculture Council. The members of the Council are the Secretary of Agriculture, the Secretary of Commerce, and the Secretary of the Interior, or the designee of any such Secretary.

(b) CHAIRMAN AND TERMS.—(1) The Council shall have a Chairman and, except as provided in paragraph (2)(A), the term of office of the Chairman is 2 years.

(2) Within 1 month after the date of the enactment of this Act, the Council shall select from among its members—

(A) the Chairman to serve during the period beginning on the date of selection and ending at the close of September 30, 1980;

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(B) the Chairman (who may not be the Secretary selected under subparagraph (A)) to serve during the 2-year period beginning on October 1, 1980; and

(C) the Chairman (who may not be the Secretary selected under subparagraph (A) or (B)) to serve during the 2-year period beginning on October 1, 1982.

(3) After September 30, 1984, the chairmanship of the Council shall be rotated among the Secretaries concerned according to the sequence established under paragraph (2).

(c) STAFF SUPPORT.—The members of the Council shall assign from their respective departments such staff and clerical personnel as may be necessary to enable the Council to carry out its functions under this Act.

(d) ADVISORY COMMITTEE.—The Council may establish, and appoint the members of, an advisory committee to assist the Council in carrying out its functions under this Act. Individuals appointed to the advisory committee shall be knowledgeable and experienced in the principles and practices of aquaculture. The members of the advisory committee (other than officers or employees of the Federal Government), while away from their homes or regular places of business in the performance of services for the advisory committee, shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed ex-

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penses under section 5703 of title 5 of the United States Code.

(e) INFORMATION SERVICES.—(1) In addition to performing such other functions that are assigned to it under this Act, the Council shall—

(A) establish and maintain an information service for the collection, analysis, and dissemination of scientific, technical, legal, and economic information relating to aquaculture;

(B) conduct appropriate surveys, in coordination with other Federal departments and agencies, of public and private aquacultural activities being conducted in the United States for the purpose of acquiring information on acreages, water use, production, culture techniques, and other relevant matters;

(C) arrange with foreign nations for the exchange of information relating to aquaculture;

(D) conduct a continuing study to determine whether existing capture fisheries could be adversely affected by competition from products produced by commercial aquacultural enterprises and include in such study—

(i) an assessment of any such adverse effect, by species and by geographical region, on such fisheries, and

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(ii) recommended measures to ameliorate any such effect; and

(E) report to Congress on the findings made under the study provided for under such subparagraph (D) in the biennial status report required under subsection (f).

(2) Any production information submitted to the Council under paragraph (1)(B) shall be confidential and may only be disclosed to the advisory committee that may be established under subsection (d) or when required under court order. The Council shall by regulation prescribe such procedures as may be necessary to preserve such confidentiality, except that the Council may release or make public any such information in any aggregate or summary form that does not directly or indirectly disclose the identity, business transactions, or trade secrets of any person who submits such information.

(f) BIENNIAL REPORT.—The Council shall prepare on a biennial basis, and submit to Congress, a report on the status of aquaculture in the United States. Each such report shall contain a description and evaluation of the actions undertaken with respect to the plan during the reporting period, an explanation of any revisions made to the Plan under section 5(d) during the reporting period, and such other comments and recommendations regarding aquaculture in the United States as the Council deems appropriate. The first report re-

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quired under this subsection shall be submitted to Congress September 30, 1980.

SEC. 5. NATIONAL AQUACULTURE DEVELOPMENT PLAN.

(a)(1) Before the close of the 18-month period beginning on the effective date of this Act, the Council shall by regulation establish a National Aquaculture Development Plan (hereinafter in this Act referred to as the "plan"). Within 6 months after such date of enactment and before developing proposed regulations with respect to the plan, the Council shall give interested persons an opportunity to participate in the development of the plan by holding public hearings at regional locations that the Council deems appropriate taking into account—

(A) the geographical proximity of States to one another,

(B) the similarity of States in aquacultural activities and potential, and

(C) other relevant factors.

(2) In developing the plan, and revisions thereto under subsection (d), the Council shall consult with the Office of Science and Technology Policy, other appropriate Federal departments and agencies, appropriate States, and appropriate Regional Fishery Management Councils established under section 302 of the Fishery Conservation and Management Act of 1976 (16 U.S.C. 1852).

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(b) CONTENTS OF PLAN.—The plan shall—

(1) identify those aquatic species (hereinafter referred to in this Act as "priority aquatic species") which the Council determines to have a potential for culturing on a commercial or other basis, which determination shall be made by the Council after taking into account—

(A) the extent of commercial aquaculture, if any, currently being carried out with respect to such species, and the projected biological and economic feasibility of culturing such species;

(B) the extent to which aquaculture research and development have been undertaken, within the public and private sectors, with respect to such species;

(C) the time and resources which will be required to develop aquaculture technology to the point where such species can be cultured on a commercial or other basis;

(D) such other factors as the Council determines to be appropriate; and

(2) contain an aquaculture development program, prepared by the Council for each priority aquatic species.

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(c) The aquaculture development program contained in the plan for each priority aquatic species shall set forth those actions which the Council determines should be undertaken, and the period of time within which each such action should be completed, to provide for the culture of each such species on a commercial or other basis. Such actions, with respect to each priority aquatic species, shall include—

(1) such research and development, technical assistance, demonstration, extension education, and training as may be necessary and appropriate regarding—

(A) aquaculture facility design and operation,

(B) water quality management,

(C) utilization of waste products (including thermal effluents),

(D) nutrition and the development of economical feeds,

(E) life history, behavior, genetics, physiology, and pathology and disease control (including research regarding organisms which may not be harmful to fish and shellfish but are injurious to humans),

(F) life history, behavior, genetics, physiology and pathology and disease control of organisms designated as potential food sources for aquaculture species,

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(G) processing and market development, and

(H) production management and quality control;

(2) research with respect to the effect of the culture of such species on estuarine and other water areas, including the effects on the natural flora and fauna;

(3) the identification and analysis of any legal or regulatory constraints which may affect the culture of such species;

(4) the development of adequate supplies of seed stock;

(5) the construction, purchase, lease, or acquisition of necessary developmental aquaculture facilities; and

(6) Such other actions relating to research and development, technical assistance, demonstration, extension education, and training as the Secretary deems necessary and appropriate.

(d) In preparing an aquaculture development program for any priority aquatic species, and in reviewing any such program pursuant to subsection (f), the Council shall, to the extent practicable, take into account any significant action which has been, or which is proposed to be undertaken by

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any other Federal agency, any State agency, or any person, and which may affect the accomplishment of the program.

(e) ACTIONS AND IMPLEMENTATION.—The plan shall specify—

(1) with respect to each program included within the plan pursuant to subsection (b), those actions that the Council determines should be undertaken, and the period of time within which each such action should be completed, in order to implement the program; and

(2) with respect to each action referred to in paragraph (1), that the Secretary of Agriculture, the Secretary of Commerce, or the Secretary of the Interior, acting individually, jointly, or collectively, has responsibility for implementing the action.

The specifications of Secretarial responsibilities under paragraph (2) for implementing actions shall be determined by the Council on the basis of—

(A) the responsibilities conferred on the respective Secretaries by law or by any executive action having the effect of law (including but not limited to, Reorganization Plan Numbered 4 of 1970); and

(B) the experience, expertise, and other appropriate resources that the department of each such Secretary may have with respect to the action required under the program concerned.

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(f) REVISION OF PLAN.—(1) The Council, and any Federal or State agency which has significant functions which relate to aquaculture, shall review on an annual basis—

(A) each aquatic species not identified as a priority aquatic species; and

(B) the aquaculture development program established under the plan for each priority aquatic species to determine whether the actions specified in the program are being accomplished on a successful and timely basis.

(2) If as a result of the review conducted pursuant to paragraph (1)(A), the Council determines, after taking into account the criteria set forth in subsection (b)(1), that any aquatic species has a potential for culturing on a commercial or other basis the Council shall by regulation amend the plan to identify such species as a priority aquatic species and prepare an aquaculture development program for such species pursuant to subsection (c).

(3) If as a result of the review conducted pursuant to paragraph (1)(B), the Council finds that—

(A) any action so specified should be revised, the Secretary shall make such revision to the program as he deems necessary and appropriate; or

(B) sufficient progress is not being made with respect to any such program or that actions taken under

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any such program indicate that culture of the priority aquatic species concerned is doubtful, the Council shall cancel the program.

The Council shall by regulation amend the plan whenever any revision or cancellation is made pursuant to this subsection.

(g) CONTINUING AQUACULTURE ASSESSMENT.—The Council shall undertake a continuing assessment of aquaculture in the United States for the purpose of maintaining, on a continuing basis—

(1) a complete profile of the aquacultural industry with respect to the incidence, size, and status of commercial aquacultural enterprises;

(2) the identification of private and public institutions and organizations involved in aquacultural research, extension, credit, and market development;

(3) the identification of the various aquatic species being cultured and a description of the status of commercial development of each such species;

(4) to the extent practicable, the identification of aquacultural production regions, species, and markets that have significant potential for development;

(5) a catalog describing all programs and activities that directly or indirectly encourage, support, or assist aquaculture; and

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(6) the identification of the economic, physical, and social constraints that inhibit the development of aquaculture in the United States.

Within 6 months after the date of the enactment of this Act, the Council shall complete an initial assessment for purposes of carrying out this subsection. In developing the plan, the Council shall take into account the information obtained as a result of such initial assessment.

SEC. 6. FUNCTIONS AND POWERS.

(a) MANDATORY FUNCTIONS.—In implementing the aquaculture development program prepared under section 5 for any priority aquatic species, the Secretary of Agriculture, the Secretary of Commerce, or the Secretary of the Interior, as the case may be, shall—

(1) provide advisory, educational, and technical assistance (including training) with respect to culture of the species to interested public and private organizations and individuals, but in providing such assistance, shall, to the maximum extent practicable, avoid duplication of like assistance provided by other Federal agencies;

(2) consult and cooperate with interested persons, Federal, State, and local government agencies, regional commissions, and educational institutions regarding the development of aquaculture technology;

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(3) produce, under the authority of section 4(c)(4), and sell at cost seed stock for the priority aquatic species when privately produced seed stock is unavailable, unreliable, or not sufficient to meet production needs;

(4) prescribe such regulations as may be necessary to carry out such program; and

(5) encourage the implementation of aquacultural technology in the rehabilitation and enhancement of publicly owned fish and shellfish stocks (including such rehabilitation and enhancement by private nonprofit enterprises), and in the development of private commercial aquacultural enterprises;

(b) DISCRETIONARY FUNCTIONS.—In implementing any program under the plan, the Secretary of Agriculture, the Secretary of Commerce, or the Secretary of the Interior, as the case may be, may—

(1) for the purposes of assessing the biological and economic feasibility of any aquaculture system—

(A) conduct scale tests of the system, and, if necessary for the conduct of any such test, construct, operate, and maintain developmental aquaculture facilities, including, but not limited to, pilot plants for testing laboratory results; and

(B) conduct such other tests or analyses as may be necessary;

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(2) develop methods to enhance aquatic species stocks by aquaculture;

(3) carry out such studies and research with respect to aquatic species as may be appropriate regardless of whether such species is or has been identified as a priority species; and

(4) take such other actions as the such Secretary deems necessary and appropriate.

(c) ACCEPTANCE OF GIFTS, BEQUESTS, ETC.—(1) The Secretary of Agriculture, the Secretary of Commerce, and the Secretary of the Interior may each accept any gift, temporary donation, or devise or bequest of real or personal property, or the proceeds from the sale or other disposition of such property or interests therein, for use in performing any function that such Secretary may have under this Act. Any such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude, if such terms are deemed by the Secretary concerned to be in accordance with law and compatible with the purpose for which acceptance is sought.

(2) Gifts and bequests of money, and the proceeds from the sale of other property received as a gift or bequest under this subsection, shall be deposited in a separate account in the Treasury of the United States and shall be disbursed upon the order of the Secretary concerned.

56-308 O - 80 - 9

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SEC. 7. COORDINATION OF FEDERAL AGENCY ACTIVITIES REGARDING AQUACULTURE.

(a) ESTABLISHMENT.—(1) There is established the Interagency Committee on Aquaculture (hereinafter in this section referred to as the "Committee") which shall be composed of the following officers or their designees:

(A) The Secretary, who shall be the Chairman of the Committee.

(B) The Secretary of the Interior.

(C) The Secretary of Agriculture.

(D) The Administrator of the Environmental Protection Agency.

(E) The Administrator of the Energy Research and Development Administration.

(F) The Commissioner of Food and Drugs.

(G) The Administrator of the Small Business Administration.

(H) The Chief of Engineers.

(I) The Governor of the Farm Credit Administration.

(J) The chief executive officer of any other Federal agency and any Regional Fishery Management Council which the Secretary finds to have significant functions which relate, or may relate, to the development of aquaculture.

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(2) FUNCTION.—The functions of the Committee shall be—

(A) to insure that there is a continuing exchange of information among the agencies represented on the Committee with respect to the nature and status of the programs or projects being carried out by such agencies which relate, or which may relate, to aquaculture in general or to the implementation of the plan; and

(B) to review on a continuing basis, for purposes of exchange of information the relevant programs and projects of all Federal agencies to determine whether they are being carried out in compliance with subsection (b).

(b) FEDERAL CONSISTENCY.—Each Federal agency which has any function or responsibility with respect to aquaculture or has jurisdiction over any activity which affects, or may affect, the achievement of the purposes of this Act, shall in consultation with the Committee and to the maximum extent practicable, carry out such function, responsibility, and activity in a manner which is consistent with the purposes of this Act.

(c) Nothing in this Act shall be construed to amend, repeal, or otherwise modify the authority of any Federal officer or any Federal agency to carry out any functions relating

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to aquaculture which are authorized under any other provision of law.

SEC. 8. CONTRACTS AND GRANTS.

(a) IN GENERAL.—The Secretary of Agriculture, the Secretary of Commerce, and the Secretary of the Interior may each carry out any program that such Secretary is responsible for implementing under the Plan through grants to, or contracts with, any person, any other Federal department or agency, any State agency, or any regional commission.

(b) TERMS AND CONDITIONS.—Any contract entered into, or any grant made, under subsection (a) shall contain such terms and conditions as the Secretary concerned shall by regulation prescribe as being necessary or appropriate to protect the interests of the United States, except that no such contract may be entered into, and no such grant may be made, for any purpose which is in violation of any applicable State or local law.

(c) LIMITATION.—The amount of any grant made under subsection (a) may not exceed an amount equal to one-half the estimated cost of the project for which the grant is made.

(d) AUDIT.—Each recipient of a grant or contract under this section shall make available to the Secretary concerned and to the Comptroller General of the United States, for purposes of audit and examination, any book, document, paper,

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and record that is pertinent to the funds received under such grant or contract.

SEC. 9. AQUACULTURAL DEMONSTRATION PROJECTS.

(a) DEFINITION.—As used in this section, the term "demonstration project" means any project that demonstrates, in a practical manner, the use, application, design, construction, or operation of procedures, techniques, equipment, or facilities that are useful and beneficial to aquacultural producers.

(b) IN GENERAL.—In order to further the development of aquaculture, the Secretary, the Secretary of Agriculture, and the Secretary of the Interior may each provide financial assistance under this section.

(c) FINANCIAL ASSISTANCE.—The financial assistance provided under this section shall be in the form of grants in an amount not to exceed 50 percent of the estimated cost of any demonstration project.

(d) APPLICATIONS FOR FINANCIAL ASSISTANCE.—Application for financial assistance under this section may be made by any person (including, but not limited to, any State agency and any regional commission) to the Secretary concerned in such form and manner as such Secretary shall prescribe. In providing financial assistance under this section, the Secretary concerned shall take into consideration wheth-

56-308 O - 80 - 10

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er similar projects are being implemented under Federal, State, or private auspices.

(e) TERMS AND CONDITIONS.—Financial assistance shall be provided under this section to each recipient under such terms and conditions as the Secretary concerned deems to be necessary or appropriate to carry out this section, including, but not limited to, conditions—

(1) relating to the disposition by the recipient of products resulting from the demonstration project and of the proceeds resulting from any sale of such products; and

(2) requiring the recipient—

(A) if applicable, to provide tours of the project for aquacultural producers and other interested groups and individuals and, upon request, provide such groups and individuals with information concerning the project, and

(B) to compile on an annual basis a report setting forth the income, cost, operating difficulties, and producer interest with respect to the project and to submit the report to the Secretary concerned along with the recommendation for project modifications that the recipient deems advisable.

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(f) INFORMATION DISSEMINATION.—The results obtained from each demonstration project assisted under this section shall be disseminated through the State cooperative extension services, the Sea Grant Marine Advisory Program, and such other systems as the Secretary concerned deems appropriate.

SEC. 10. GUARANTEES OF OBLIGATIONS ISSUED FOR AQUACULTURE FACILITIES.

(a) IN GENERAL.—(1) The Secretary of Agriculture and the Secretary of Commerce (each of whom is hereafter in this section referred to as the "Secretary") may each, subject to the provisions of this section, guarantee, or make a commitment to guarantee, the payment of interest on, and the principal amount of, any obligation issued by an obligor for any of the following purposes:

(A) The financing of the construction, reconstruction, or reconditioning of any aquaculture facility (including the financing of the purchase cost of any aquaculture facility to be reconstructed or reconditioned); except that no obligation may be guaranteed under this section later than 2 years after the date of the completion of the construction, reconstruction, or reconditioning of the aquaculture facility involved.

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(B) The acquisition of stocks of aquatic species in all stages of development necessary to initiate any aquaculture facility.

(C) The financing of the initial operating expenses of any aquaculture facility.

(D) The financing of marketing operations exclusively for aquaculture products.

(E) The refinancing of any existing obligation issued for any of the purposes specified in subparagraph (A), (B), (C), or (D), whether or not guaranteed under this section, including, but not limited to, any short-term obligation incurred for the purpose of obtaining temporary funds for refinancing.

(F) Guarantees and commitments to guarantee may be made under this section without regard to section 3679(a) of the Revised Statutes of the United States (31 U.S.C. 665(a)).

(2) The full faith and credit of the United States is pledged to the payment of all guarantees made under this section with respect to both principal and interest, including any interest, if provided for in the guarantee, which may accrue between the date of default under a guaranteed obligation and the payment in full of the guarantee.

(3) Any guarantee, or commitment to guarantee, made by the Secretary under this section shall be conclusive evi-

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dence of the eligibility of the obligation for such guarantee, and the validity of any guarantee, or commitment of guarantee, so made shall be incontestable.

(4) The aggregate unpaid principal amount of all obligations outstanding at any one time and guaranteed under this section—

(A) by the Secretary of Agriculture may not exceed $50,000,000; and

(B) by the Secretary of Commerce may not exceed $50,000,000.

To the extent that one Secretary has not guaranteed obligations up to the limit established for that Secretary under this paragraph, that Secretary may allow the other Secretary to guarantee obligations under this section in amounts to be charged against such limit; but the aggregate unpaid principal amount of all obligations outstanding at any one time and guaranteed under this section by both Secretaries may not exceed $100,000,000.

(b) CONDITIONS.—(1) Obligations guaranteed under this section—

(A) shall have an obligor approved by the Secretary as being responsible and possessing the ability, experience, financial resources, and other qualifications necessary for the adequate operation and maintenance of the aquaculture facilities;

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(B) shall be in an aggregate principal amount which does not exceed 90 percent of the actual cost involved or the depreciated actual cost, as determined by the Secretary;

(C) shall have maturity dates satisfactory to the Secretary, but not to exceed 25 years;

(D) shall provide for payments by the obligor satisfactory to the Secretary; and

(E) shall bear interest (exclusive of charges for the guarantee and service charges, if any) at rates not to exceed such percentage per annum on the unpaid principal as the Secretary determines to be reasonable, taking into account the range of interest rates prevailing in the private market for similar loans and the risks assumed by the Secretary.

(2) In guaranteeing any obligation under this section, the Secretary shall give preference to any person with 40 or fewer employees which, together with its affiliates, is primarily engaged in the business of aquaculture or commercial fishing for aquatic species.

(3) No obligation shall be guaranteed under this section unless the obligor conveys or agrees to convey to the Secretary such security interest as the Secretary may require to reasonably protect the interests of the United States.

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(c) FEES.—(1) The Secretary may charge a fee for any obligation guaranteed under this section, the amount of which shall be established by the Secretary by regulation not to exceed one-half of 1 percent per annum of the outstanding principal balance of the obligation. Fee payments shall be made by the obligor to the Secretary when moneys are first advanced under a guaranteed obligation and at least 60 days before each anniversary date thereafter.

(2) The Secretary shall charge and collect from the obligor such amounts as the Secretary may deem reasonable for the investigation of the application for any guarantee, for the appraisal of properties offered as security for any guarantee, and for the inspection of such properties during construction, reconstruction, or reconditioning, except that such charges shall not aggregate more than one-half of 1 percent of the original principal amount of the obligation to be guaranteed.

(3) All fees and other amounts received by the Secretary under the provisions of this subsection shall be deposited in the fund.

(4) Obligations guaranteed under this section, and agreements relating thereto, shall contain such other provisions with respect to the protection of the security interests of the United States (including acceleration and subrogation provisions and the issuance of notes by the obligor to the

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Secretary), liens and releases of liens, payments of taxes, and such other matters as the Secretary may prescribe.

(d) DEFAULT.—(1) In the event of a default, which has continued for 90 days, in any payment by the obligor of principal or interest due under any obligation guaranteed under this section, the obligee or the obligee's agent shall have the right to demand, at or before the expiration of such period as may be specified in the guarantee or related agreements, but not later than 180 days from the date of such default, payment by the Secretary of the unpaid principal amount of said obligation. Within such period as may be specified in the guarantee or related agreements, but not later than 60 days from the date of such demand, the Secretary shall promptly pay to the obligee or his agent the unpaid principal amount of the obligation and unpaid interest thereon to the date of payment; except that the Secretary shall not be required to make such payment if before the expiration of such period the Secretary finds that there has been no default by the obligor in the payment of principal or interest or that such default has been remedied before any such demand.

(2) Payments required to be made by the Secretary under paragraph (1) shall be made by the Secretary from the Fund.

(3) In the event of any payment by the Secretary under paragraph (1), the Secretary shall have all rights in any secu-

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rity held by him relating to his guarantee of such obligations as are conferred upon him under any security agreement with the obligor. Notwithstanding any other provision of law relating to the acquisition, handling, or disposal of property by the United States, the Secretary may, under such terms and conditions as the Secretary prescribes or approves, complete, recondition, reconstruct, renovate, repair, maintain, operate, or sell any property acquired by him pursuant to a security agreement with the obligor.

(4) After any default referred to in paragraph (1), the Secretary shall take such action against the obligor or any other parties liable thereunder that, in his discretion, may be required to protect the interests of the United States. Any suit may be brought in the name of the United States or in the name of the obligee and the obligee shall make available to the United States all records and evidence necessary to prosecute any such suit. The Secretary may accept a conveyance of title to and possession of property from the obligor or other parties liable to the Secretary and may purchase the property for an amount not greater than the unpaid principal amount of such obligation and interest thereon. In the event the Secretary receives through the sale of property an amount of cash in excess of any payment made to an obligee under paragraph (1) and the expenses of collection of such amounts, he shall pay such excess to the obligor.

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(5) Whoever, for the purpose of obtaining any loan or advance of credit from any person with the intent that an obligation relating to such loan or advance of credit shall be offered to or accepted by the Secretary to be guaranteed, or for the purpose of obtaining any extension or renewal of any loan, advance of credit, or mortgage relating to an obligation guaranteed by the Secretary, or the acceptance, release, or substitution of any security on such a loan, advance of credit, of for the purpose of influencing in any way the action of the Secretary under this section, makes, passes, utters, or publishes, or causes to be made, passed, uttered, or published any statement, knowing the same to be false, or alters, forges, or counterfeits, or causes or procures to be altered, forged, or counterfeited, any instrument, paper, or document, or utters, publishes, or passes as true, or causes to be uttered, published, or passed as true, any instrument, paper, or document, knowing it to have been altered, forged, or counterfeited, or willfully overvalues any security, asset, or income shall be punished by a fine of not more than $5,000, or by imprisonment for not more than 2 years, or both.

(e) The Secretary shall promulgate such rules and regulations as may be deemed necessary or appropriate to carry out the purposes and provisions of this section.

(f) For purposes of this section—

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(1) The term "actual cost" of an aquaculture facility, as of any specified date, means the aggregate, as determined by the Secretary, of—

(A) all amounts paid by, or for the account of, the obligor with respect to such facility on or before that date; and

(B) all amounts which the obligor is then obligated to pay from time to time thereafter, for the construction, reconstruction, or reconditioning of such facility.

(2) The terms "construction", "reconstruction", or "reconditioning" include, but are not limited to, designing, inspecting, outfitting, and equipping of the aquaculture facility involved.

(3) The term "depreciated actual cost" means the actual cost depreciated on a straightline basis over the useful life of the property involved as determined by the Secretary.

(4) The term "obligation" means any note, bond, debenture, or other evidence of indebtedness issued for one of the purposes specified in subsection (a).

(5) The term "obligee" means the holder of any obligation.

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(6) The term "obligor" means any person primarily liable for payment of the principal of or interest on any obligation.

SEC. 11. INSURANCE AGAINST ESSENTIAL STOCK LOSSES INCURRED IN AQUACULTURE FACILITY OPERATIONS.

(a) DEFINITIONS.—As used in this section, unless the context otherwise requires—

(1) The term "essential stock insurance" means insurance against loss of, or damage to, any aquatic species being cultured at an aquaculture facility due to unavoidable or natural causes, including, but not limited to, drought, pollution, hail, frost, wind, winterkill, freeze, lightning, fire, excessive rain, flood, snow, wildlife, hurricane, tornado, insect or parasite infestation, disease, and such other unavoidable or natural causes as the Secretary by regulation shall specify.

(2) The term "insurer" includes any insurance company or group of companies under common ownership which is authorized to engage in the insurance business under the laws of any State.

(3) The term "owner" means any person having an insurable interest in an aquaculture facility or aquatic species stock.

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(4) The term "pool" means any pool or association of insurers in any State which is formed, associated, or otherwise created for the purpose of making insurance more readily available.

(5) The term "reasonable premium rate" means that premium rate determined by the Secretary, which would permit the purchase of any direct insurance coverage by a reasonably prudent person in similar circumstances with due regard to the costs and benefits involved.

(b) The Secretary may by regulation define any technical or trade term necessary in the administration of this section, insofar as any such definition is not inconsistent with the provisions of this section.

(b) INSURANCE STUDY.—(1) The Council shall conduct, within 18 months after the effective date of this Act, a study to determine whether direct insurance for essential stock loss is generally available to owners at reasonable premium rates, through insurers, pools, or a suitable program adopted under State law.

(2)(A) If the Secretary of Agriculture or the Secretary of Commerce (each of whom is hereafter in this section referred to as the "Secretary") finds, as a result of the study referred to in paragraph (1), that essential stock insurance is not available at reasonable premium rates in any State and

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that such insurance has not been provided by State action, the Secretary may establish a program to provide such insurance in such State.

(B) Any essential stock insurance issued by the Secretary under this paragraph shall be subject to such terms and conditions and to such deductibles and other restrictions and limitations as the Secretary deems appropriate; except that the Secretary may not provide essential stock insurance with respect to any stock of aquatic species if the Secretary determines such stock to be uninsurable due to the failure of the owner to follow established principles for culturing aquatic species or due to the lack of reasonable protective measures at the aquaculture facility concerned to prevent the loss of, or damage to, the stock being cultured.

(d) PREMIUM RATES.—(1) In determining the premium rate for any essential stock insurance offered from time to time under subsection (c) the Secretary shall consult with persons knowledgeable and experienced in insurance, including, but not limited to, State insurance regulatory authorities, and may take into consideration with respect to the insurance concerned, the nature and degree of risk involved, the protective devices employed, the extent of past and anticipated losses, the prevailing rate for similar coverages, the economic importance of the insurance, and the relative abilities of the

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particular classes and types of insureds to pay the actual premium for such coverage.

(2)(A) The Secretary may not establish the premium rate for essential stock insurance at less than 60 percent of the actual premium rate for such insurance.

(B) For purposes of subparagraph (A), the actual premium rate for essential stock insurance offered under this section shall be determined as follows:

(i) If insurance of the same kind is generally offered by insurers or pools in the State concerned, the actual premium rate shall be that rate which the Secretary determines to be the median premium rate for all such insurance so offered.

(ii) If insurance of the same kind is not generally offered by insurers or pools in the State concerned, the actual premium rate shall be that rate which the Secretary determines to be the rate at which insurers or pools in such State would offer such insurance, taking into account actuarially sound principles applicable to the elements making up such rate, including, but not limited to, claim losses, general administrative expenses, acquisition expenses, taxes, license fees, and profits.

In making determinations under clauses (i) and (ii), the Secretary shall consult with the insurance regulatory authority

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of the State concerned and any rate advisory organization licensed by such State.

(3) Nothing in this section shall be construed to prohibit or require either the adopting of uniform national rates or the periodic modification of the currently estimated reasonable premium rates for any particular coverage, class, State, or risk on the basis of additional information or actual loss experience.

(e) REINSURANCE.—(1) The Secretary may enter into any contract, agreement, treaty, or other arrangement with any insurer or pool to provide reinsurance coverage with respect to essential stock insurance issued by such insurer or pool, in consideration of payment of such premiums, fees, or other charges by insurers or pools which the Secretary deems to be appropriate, after consultation with persons knowledgeable and experienced in insurance.

(2) Reinsurance issued under this subsection shall reimburse an insurer or pool for its total proved and approved claims for covered losses resulting from providing insurance concerned during the term of the reinsurance contract, agreement, treaty, or other arrangement, over and above the amount of the insurer's or pool's retention of such losses, as provided in such reinsurance, contract, agreement, treaty, or other arrangement entered into under this section.

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(3) Such contracts, agreements, treaties, or other arrangements may be made without regard to section 3679(a) of the Revised Statutes of the United States (31 U.S.C. 665(a)), and shall include any terms and conditions which the Secretary deems necessary to carry out the purposes of this section. The premium rates and terms and conditions of such contracts, agreements, treaties, or other arrangements with an insurer or pool shall be uniform in any one year throughout the country.

(f) ADMINISTRATIVE PROVISIONS.—(1) All premiums received by the Secretary under this section shall be deposited into the fund.

(2) The Secretary, in a suit brought in the appropriate United States district court, shall be entitled to recover from any owner, insurer, or pool the amount of any unpaid premium lawfully payable to the Secretary by such owner, insurer, or pool under essential stock insurance or reinsurance issued under this section.

(3) No action or proceeding shall be brought for the recovery of any premium due the Secretary, or for the recovery of any premium paid to the Secretary in excess of the amount due, unless such action or proceeding is commenced within 5 years after the right accrued for which the claim is made; except that, if the insurer has made or filed with the Secretary a false or fraudulent statement or other document with

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intent to evade, in whole or in part, the payment of premiums, the claim shall not be deemed to have accrued until its discovery by the Secretary.

(g) CONTRACTS.—In order to provide for maximum efficiency in the administration of the insurance and reinsurance program provided under this section, and in order to facilitate the expeditious payment of any claims under such program, the Secretary may enter into contracts with any insurer, pool, or person, for the purpose of providing for the performance of any of the following functions:

(1) The estimation or determination of any amounts of payments for reinsurance or direct insurance claims.

(2) The receipt, disbursement, and accounting for funds in making payments for reinsurance and direct insurance claims.

(3) The auditing of the records of any insurer, pool, or person to the extent necessary to assure that proper payments are made.

(4) The establishment of the basis of liability for reinsurance or essential stock insurance payments, including the total amount of proved and approved claims which may be payable to any insurer, pool, or owner, and the total amount of premiums earned by

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any insurer or pool in the respective States from essential stock insurance or reinsurance.

(5) The provision of assistance in any manner provided for in the contract to further the purposes of this section.

(h) USE OF OTHER FEDERAL EMPLOYEES, SERVICES, ETC.—The Secretary may, with the consent of the agency concerned, accept and use, on a reimbursable basis, the officers, employees, services, facilities, and information of any Federal department or agency with respect to any insurance matter that is within the purview of this section.

(i) REGULATIONS.—The Secretary may prescribe regulations establishing the general method or methods by which proved and approved claims for losses are paid under any direct insurance or reinsurance issued under this section. Proved and approved claims shall be paid from the Fund.

(j) PAYMENT OF CLAIMS.—The Secretary, in providing essential stock insurance or reinsurance under this section may adjust and pay all claims for proved and approved losses covered by such insurance and, upon the disallowance by the Secretary, or upon the refusal of the claimant to accept the amount allowed upon any such claim, the claimant, within one year after the date of mailing of notice of disallowance or partial disallowance of the claim, may institute an action on such claim against the Secretary in the United States district

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court for the district in which the insured owner or reinsured insurer or pool resides or principally conducts business, and jurisdiction is hereby conferred upon such court to hear and determine such action without regard to the amount in controversy.

(k) LIMITATIONS.—The face amount of essential stock insurance and reinsurance coverage outstanding and in force at any one time under this section—

(1) by the Secretary of Agriculture may not exceed $62,500,000; and

(2) by the Secretary of Commerce may not exceed $62,500,000.

To the extent that one Secretary has not issued any such coverage up to the limit established for that Secretary under this subsection, that Secretary may allow the other Secretary to issue such coverage under this section in amounts to be charged against such limit; but the face amount of direct insurance and reinsurance coverage outstanding and in force at any one time and issued under this section by both Secretaries may not exceed $125,000,000.

(l) TERMINATION.—No essential stock insurance or reinsurance may be issued by the Secretary under this section after the close of the 5-year period beginning on the effective date of this Act.

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SEC. 12. FEDERAL AQUACULTURE ASSISTANCE FUND.

(a) ESTABLISHMENT.—There is established in the Treasury of the United States a Federal Aquaculture Assistance Fund. The Fund shall be available to the Secretary of Agriculture and the Secretary of Commerce (each of whom is hereafter in this section referred to as the "Secretary") as a revolving fund for the purpose of carrying out, and administering sections 10 and 11. The fund shall consist of—

(1) any sums appropriated to the Fund;

(2) any fees received by the Secretary in connection with any guarantee made under section 10;

(3) recoveries and receipts received by the Secretary under security, subrogation, and other rights and authorities under section 10;

(4) premiums paid to, or recovered by, the Secretary for any direct insurance or reinsurance issued by the Secretary under section 11; and

(5) moneys deposited pursuant to the last sentence of subsection (b).

All payments made by the Secretary to carry out the provisions of sections 10 and 11 (including reimbursements to other government accounts) shall be paid from the Fund only to the extent provided in appropriation Acts. Sums in the Fund that are not currently needed for the purposes of sec-

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tions 9 and 10 shall be kept on deposit or invested in obligations of or guaranteed by the United States.

(b) TREASURY BORROWING.—If any time the moneys in the Fund are not sufficient to pay any amount the Secretary is obligated to pay under section 10 or any direct insurance or reinsurance claim under section 11 the Secretary shall issue to the Secretary of the Treasury notes or other obligations (only to such extent and in such amounts as may be provided for in appropriation Acts) in such forms and denominations, bearing such maturities, and subject to such terms and conditions as the Secretary of the Treasury prescribes. Such notes or other obligations shall bear interest at a rate determined by the Secretary of the Treasury, taking into consideration the current average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the issuance of such notes or other obligations. The Secretary of the Treasury shall purchase any notes and other obligations to be issued under this subsection, and for such purpose the Secretary may use as a public debt transaction the proceeds from the sale of any securities issued under the Second Liberty Bond Act, and the purposes for which securities may be issued under that Act, are extended to include any purchases of such notes and obligations. The Secretary of the Treasury at any time may sell any of the notes or other obligations

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acquired by the Secretary of the Treasury under this subsection. All redemptions, purchases, and sales by the Secretary of the Treasury of such notes or other obligations shall be treated as public debt transactions of the United States. Moneys borrowed under this subsection shall be deposited in the Fund and redemptions of such notes and obligations shall be made by the Secretary from the Fund.

SEC. 12. REPORT AND RECOMMENDATIONS.

Before the close of the 90th day after the close of the 3-year period beginning on the effective date of this Act, the Secretary of Agriculture and the Secretary of Commerce (each of whom is hereafter in this section referred to as the "Secretary") shall review the operation and effectiveness of the insurance program provided for under section 9 and shall submit a report thereon to the Congress, together with the recommendation of the Secretary as to whether or not such program should be continued and, if the Secretary recommends continuation, such suggestions as the Secretary may have for improving the operation and effectiveness of such program.

SEC. 13. AUTHORIZATION FOR APPROPRIATIONS.

(a) OTHER THAN TO FUND.—For purposes of carrying out provisions of this Act (other than sections 10 and 11), there are authorized to be appropriated—

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(1) to the Department of Commerce, not to exceed

(A) $7,000,000 for fiscal year 1981,

(B) $10,000,000 for each of fiscal years 1981 and 1982;

(2) to the Department of Agriculture, not to exceed

(A) $7,000,000 for fiscal year 1980, and

(B) $10,000,000 for each of fiscal years 1981 and 1982; and

(3) to the Department of the Interior, not to exceed

(A) $3,000,000 for fiscal year 1980, and

(B) $5,000,000 for each of fiscal years 1981 and 1982.

(b) TO FUND.—Commencing with fiscal year 1980, there are authorized to be appropriated, without fiscal year limitation, to the Fund such sums as may be necessary and appropriate for purposes of carrying out sections 9 and 10.

SEC. 14. EFFECTIVE DATE.

This Act shall take effect October 1, 1980.

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II

96TH CONGRESS
1ST SESSION

S. 1650

To provide for the development of aquaculture in the United States, and for other purposes.

IN THE SENATE OF THE UNITED STATES

AUGUST 2 (legislative day, JUNE 21), 1979

Mr. INOUYE (for himself, Mr. BENTSEN, Mr. CANNON, Mr. COCHRAN, Mr. HATFIELD, Mr. HAYAKAWA, Mr. HOLLINGS, Mr. MATSUNAGA, Mr. PRYOR, Mr. STEVENS, Mr. STEWART, Mr. STONE, Mr. TALMADGE, and Mr. WARNER) introduced the following bill; which was read twice and referred jointly by unanimous consent to the Committees on Agriculture, Nutrition, and Forestry and Commerce, Science, and Transportation

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A BILL

To provide for the development of aquaculture in the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Aquaculture Act of 1979".

FINDINGS, PURPOSE, AND POLICY

SEC. 2. (a) FINDINGS.—Congress finds the following:

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(1) The harvest of certain species of fish and shellfish exceeds levels of optimum sustainable yield, thereby making it more difficult to meet the increasing demand for aquatic food.

(2) To satisfy the domestic market for aquatic food, the United States imports more than 50 per centum of its fish and shellfish, but this dependence on imports adversely affects the national balance of payments and contributes to the uncertainty of supplies.

(3) Although aquaculture currently contributes approximately 10 per centum of world seafood production, less than 3 per centum of current United States seafood production results from aquaculture. Domestic aquacultural production, therefore, has the potential for significant growth.

(4) Aquacultural production of aquatic plants can provide sources of food, industrial materials, pharmaceuticals, and energy, and can assist in the control and abatement of pollution.

(5) The rehabilitation and enhancement of fish and shellfish resources are desirable applications of aquacultural technology.

(6) The principal responsibility for the development of aquaculture in the United States must rest with the private sector.

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(7) Despite its potential, the development of aquaculture in the United States has been inhibited by many economic, legal, and production factors such as inadequate credit, diffused legal jurisdiction, the lack of management information, and the lack of reliable supplies of seed stock.

(8) Many areas of the United States are suitable for aquaculture, but are subject to land-use or water-use management policies that do not adequately consider the potential for aquaculture and that may inhibit the development of aquaculture.

(b) PURPOSE.—It is the purpose of this Act to promote aquaculture in the United States by—

(1) declaring a national policy for aquaculture;

(2) establishing and implementing a national aquaculture development plan; and

(3) encouraging aquaculture activities and programs in both the public and private sectors of the economy;

that will result in increased aquacultural production, the coordination of domestic aquacultural efforts, the conservation and enhancement of aquatic resources, the creation of new industries and job opportunities, and other national benefits.

(c) POLICY.—Congress declares that aquaculture has the potential for augmenting existing commercial and recreational fisheries and for producing other renewable resources,

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thereby assisting the United States in meeting its future food needs and contributing to the solution of world resource problems. It is, therefore, in the national interest, and it is the national policy, to encourage the development of aquaculture in the United States.

DEFINITIONS

SEC. 3. As used in this Act, unless the context otherwise requires—

(1) the term "aquaculture" means the propagation and rearing of aquatic species in controlled or selected environments, including, but not limited to, ocean ranching (except private ocean ranching of Pacific salmon for profit in those States where such ranching is prohibited by law);

(2) the term "aquaculture facility" means any land, structure, or other appurtenance that is used for aquaculture and is located in any State. Such term includes, but is not limited to, any laboratory, hatchery, rearing pond, raceway, pen, incubator, or other equipment used in aquaculture;

(3) the term "aquatic species" means any species of finfish, mollusk, crustacean, or other aquatic invertebrate, amphibian, reptile, or aquatic plant;

(4) the term "person" means any individual who is a citizen or national of the United States, any Indian

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tribe, any institution of higher education, and any corporation, partnership, association or other entity (including, but not limited to, any community development corporation, producer cooperative, or fishermen's cooperative) organized or existing under the laws of any States;

(5) the term "Plan" means the National Aquaculture Development Plan required to be established under section 4;

(6) the term "Secretaries" means the Secretary of Agriculture, the Secretary of Commerce, and the Secretary of the Interior; and

(7) the term "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands of the United States, Guam, and the Commonwealth of the Northern Mariana Islands.

NATIONAL AQUACULTURE DEVELOPMENT PLAN

SEC. 4. (a) IN GENERAL.—(1) Within eighteen months after the date of the enactment of this Act, the Secretaries shall establish the National Aquaculture Development Plan. Within six months after such date of enactment, the Secretaries shall give interested persons and organizations an opportunity to comment during the development of the Plan.

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(2) In developing the Plan, and revisions thereto under subsection (d), the Secretaries shall consult with other appropriate Federal officers, appropriate States, and appropriate regional fishery management councils established under section 302 of the Fishery Conservation and Management Act of 1976 (16 U.S.C. 1852).

(3) If the Secretaries deem it to be appropriate, they may establish, and appoint the members of, an advisory committee to assist in the initial development of the Plan. Individuals appointed to the advisory committee shall be knowledgeable or experienced in the principles and practices of aquaculture. The members of the advisory committee (other than officers or employees of the Federal Government), while away from their homes or regular places of business in the performance of services for the advisory committee, shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of title 5 of the United States Code.

(b) CONTENTS OF PLAN.—The Plan shall—

(1) identify species that the Secretaries determine to have significant potential for culturing on a commercial or other basis;

(2) recommend actions to be taken by the public and private sectors (which may include, but are not

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limited to, research and development, technical assistance, demonstration, extension education, and training activities) that are necessary to achieve such potential. The Plan shall address the following matters, taking into account the status of aquaculture regarding the aquatic species concerned:

(A) aquaculture facility design and operation;

(B) water quality management;

(C) use of waste products (including thermal effluents);

(D) nutrition and the developing of economical feeds, including natural food sources;

(E) life history, genetics, physiology, pathology, and disease control (including research regarding organisms that may not be harmful to fish and shellfish, but are injurious to humans);

(F) processing and market development;

(G) production management and quality control; and

(H) the development of adequate supplies of seed stock.

(3) include, where appropriate, research programs on the effect of aquaculture on estuarine and other water areas and on the management of such areas for aquaculture;

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(4) include, where appropriate, programs to analyze, and to formulate proposed resolutions of, the legal or regulatory constraints that may affect aquaculture; and

(5) include such other research and development, technical assistance, demonstration, extension education, and training programs as the Secretaries deem necessary or appropriate to carry out the purpose and policy of this Act.

In formulating the Plan, the Secretaries shall, to the extent practicable, take into account any significant action that (i) has been, or is proposed to be, undertaken by any other Federal department or agency, any State agency, or any person; and (ii) may affect the implementation of the Plan.

(c) ACTIONS AND IMPLEMENTATION.—The Plan shall specify—

(1) with respect to those actions that the Secretaries determine should be undertaken, the period of time within which each such action should be completed, in order to implement the program; and

(2) with respect to each such action which of the Secretaries, acting individually, jointly, or collectively, has the responsibility for implementing the action.

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The specifications of Secretarial responsibilities under paragraph (2) for implementing actions shall be determined on the basis of—

(A) the responsibilities conferred on the respective Secretaries by law or by any executive action having the effect of law (including, but not limited to, Reorganization Plan Numbered 4 of 1970); and

(B) the experience, expertise, and other appropriate resources that the department of each such Secretary may have with respect to the action required under the program concerned.

(d) REVISION OF PLAN.—The Secretaries shall undertake periodic reviews of the operation and effectiveness of the Plan. If as a result of any such review, or the aquacultural assessment required under subsection (e), the Secretaries determine that—

(1) any aquatic species not currently identified in the Plan has significant potential for aquaculture;

(2) any action specified in the Plan is not being accomplished on a successful and timely basis; or

(3) any action specified in the Plan should be terminated because its objectives have been achieved or its projected benefits do not warrant further support;

the Secretaries shall appropriately amend the Plan.

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(e) CONTINUING AQUACULTURE ASSESSMENT.—The Secretaries, through the Joint Subcommittee on Aquaculture (section 6), shall undertake a continuing assessment of aquaculture in the United States for the purpose of maintaining, on a continuing basis—

(1) a complete profile of the aquacultural industry with respect to the incidence, size, and status of commercial aquacultural enterprises;

(2) the identification of private and public institutions and organizations involved in aquacultural research, extension, credit, and market development;

(3) the identification of the various aquatic species being cultured and a description of the status of commercial development of each such species;

(4) to the extent practicable, the identification of aquacultural production regions, species, and markets that have significant potential for development;

(5) a catalog describing all Federal programs and activities that directly or indirectly encourage, support, or assist aquaculture; and

(6) the identification of the economic, physical, legal, institutional, and social constraints that inhibit the development of aquaculture in the United States.

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FUNCTIONS AND POWERS OF SECRETARIES

SEC. 5. (a) MANDATORY FUNCTIONS.—In implementing any actions under the Plan, the Secretaries shall—

(1) provide advisory, educational, and technical assistance (including training) with respect to aquaculture to interested persons, but in providing such assistance, shall, to the maximum extent practicable, avoid duplication of similar assistance provided by other Federal departments and agencies and by State agencies;

(2) consult and cooperate with interested persons, Federal departments and agencies, State agencies, and regional commissions;

(3) encourage the implementation of aquacultural technology in the rehabilitation and enhancement of publicly owned fish and shellfish stocks (including such rehabilitation and enhancement by private nonprofit enterprises), and in the development of private commercial aquacultural enterprises; and

(4) prescribe such regulations as may be necessary to carry out such a program.

(b) DISCRETIONARY FUNCTIONS.—In implementing any program under the Plan, the Secretaries may—

(1) for the purposes of assessing the biological, technical and economic feasibility of any aquacultural system—

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(A) conduct tests of the system and, if necessary, construct, operate, and maintain developmental aquaculture facilities for testing laboratory results, and

(B) conduct such other tests or analyses as may be necessary;

(2) develop methods to enhance stocks of aquatic species; and

(3) conduct such other tests or analyses or take such other actions as the Secretaries deem necessary or appropriate.

(c) INFORMATION SERVICES.—(1) In addition to performing such other functions that are required under this Act, the Secretaries shall—

(A) establish and maintain an information service for the collection, analysis, and dissemination of scientific, technical, legal, and economical information relating to aquaculture;

(B) conduct appropriate surveys, in coordination with other Federal departments and agencies, of public and private aquacultural activities being conducted in the United States for the purpose of acquiring information on acreages, water use, production, culture techniques, and other relevant matters;

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(C) arrange with foreign nations for the exchange of information relating to aquaculture and support a translation service;

(D) conduct a continuing study to determine whether existing capture fisheries could be adversely affected by competition from products produced by commercial aquacultural enterprises and include in such study—

(i) an assessment of any adverse effect, by species and by geographical region on such fisheries, and

(ii) recommended measures to ameliorate any such effect; and

(E) report to Congress on the findings made under the study provided for under subparagraph (D) in the biennial status report required under subsection (d).

(2) Any production information submitted to the Secretaries under paragraph (1)(B) shall be confidential and may only be disclosed if required under court order. The Secretaries shall prescribe such procedures as may be necessary to preserve such confidentiality, except that the Secretaries may release or make public any information in any aggregate or summary form that does not directly or indirectly disclose the identity, business transactions, or trade secrets of any person who submits such information.

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(d) BIENNIAL REPORT.—The Secretaries, through the Joint Subcommittee on Aquaculture, shall prepare on a biennial basis, and submit to Congress, a report on the status of aquaculture in the United States. Each such report shall contain a description and evaluation of the actions undertaken with respect to the Plan during the reporting period, and explanation of any revisions made to the Plan under section 4(d) during the reporting period, and such other comments and recommendations regarding aquaculture in the United States as the Secretaries deem appropriate. The first report required under this subsection shall be submitted to Congress by September 30, 1981.

COORDINATION OF NATIONAL ACTIVITIES REGARDING AQUACULTURE

SEC. 6. (a) ESTABLISHMENT.—There is established the Joint Subcommittee on Aquaculture of the Federal Coordinating Council on Science, Engineering, and Technology (hereafter in this section referred to as the "Subcommittee") that shall be composed of the following members or their designees:

(1) the Secretary of Agriculture,

(2) the Secretary of Commerce,

(3) the Secretary of the Interior,

(4) the Secretary of Energy,

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(5) the Secretary of Health, Education, and Welfare,

(6) the Administrator of the Environmental Protection Agency,

(7) the Chief of Engineers,

(8) the Administrator of the Small Business Administration,

(9) the Administrator of the Agency for International Development,

(10) the Chairman of the Tennessee Valley Authority,

(11) the Director of the National Science Foundation,

(12) the Governor of the Farm Credit Administration, and

(13) other Federal agencies as appropriate.

(b) PURPOSE AND FUNCTIONS.—The purpose of the Joint Subcommittee on Aquaculture is to increase the overall effectiveness and productivity of Federal aquaculture research, transfer, and assistance programs. In fulfilling this purpose the Subcommittee shall—

(1) review national needs for aquaculture research, transfer, and assistance;

(2) assess the effectiveness and adequacy of Federal efforts to meet those national needs;

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(3) undertake planning, coordination, and communication among Federal agencies engaged in the science, engineering, and technology of aquaculture;

(4) collect, compile, and disseminate information;

(5) encourage joint programs among Federal agencies in areas of mutual interest; and

(6) recommend to the sponsoring Committees (the Committee on Atmosphere and Oceans and the Committee on Food and Renewable Resources) and the Federal Council specific actions on issues, problems, plans, and programs in aquaculture.

(c) CHAIRMAN.—The Chairman of the Joint Subcommittee on Aquaculture shall serve a term of two years and shall be selected by mutual agreement of the Chairmen of the sponsoring committees of the Federal Council.

(d) REPORTS.—The Subcommittee shall regularly report to the Chairmen of the two sponsoring Committees and through them to the Chairman of the Federal Council, on the Subcommittee's activities and on recommendations concerning Federal policies and programs related to aquaculture.

(e) FEDERAL CONSISTENCY.—Each Federal department and agency that has functions or responsibilities with respect to aquaculture or has jurisdiction over any activity that affects, or that may affect, the achievement of the purpose and policy of this Act, shall, in consultation with the

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Subcommittee and to the maximum extent practicable, perform such function, responsibility, or activity in a manner that is consistent with the purpose and policy of this Act.

CONTRACTS AND GRANTS

SEC. 7. (a) IN GENERAL.—The Secretaries may each carry out any action that such Secretary is responsible for implementing under the Plan through grants to, or contracts with, any person, any other Federal department or agency, any State agency, or any regional commission.

(b) TERMS AND CONDITIONS.—Any contract entered into, or any grant made, under subsection (a) shall contain such terms and conditions as the Secretary concerned shall by regulation prescribe as being necessary or appropriate to protect the interests of the United States, except that no such contract may be entered into, and no such grant may be made, for any purpose which is in violation of any applicable State or local law.

(c) LIMITATION.—The amount of any grant made under subsection (a) may not exceed an amount equal to one-half the estimated cost of the project for which the grant is made.

(d) AUDIT.—Each recipient of a grant or contract under this section shall make available to the Secretary concerned and to the Comptroller General of the United States, for purposes of audit and examination, any book, document, paper,

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and record that is pertinent to the funds received under such grant or contract.

CAPITAL REQUIREMENTS FOR AQUACULTURE

SEC. 8. (a) CAPITAL REQUIREMENTS STUDY.—The Secretaries, through the Joint Subcommittee on Aquaculture, shall conduct within twelve months after the enactment of this Act, a study of the capital requirements of the United States aquaculture industry. The study shall—

(1) document and analyze any capital constraints that affect the development of aquaculture in the United States; and

(2) evaluate the role that appropriate Federal financial assistance does or could play in filling gaps in the normal credit market with respect to aquaculture.

The study will identify the capital needs of the United States aquaculture industry, with a focus on needs that are not being filled either in normal credit channels or through government programs for direct loans, loan guarantees, disaster loans, and insurance. Upon its completion, the Secretaries shall submit the results of the study to Congress.

(b) CAPITAL REQUIREMENTS PLAN.—Based on the results of the Capital Requirements Study, and within six months of the completion of the study, the Secretaries shall formulate a Plan for acting on the study's findings. Such Plan shall include: (1) those Federal actions, if any, found to be

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necessary to meet financial needs unmet through normal credit channels and existing Federal programs; and (2) recommendations, if any, for legislative actions. Upon completion, the Plan shall be submitted to Congress.

REGULATORY CONSTRAINTS ON AQUACULTURE

SEC. 9. (a) REGULATORY CONSTRAINTS STUDY.—The Secretaries, through the Joint Subcommittee on Aquaculture, shall conduct, within twelve months after the enactment of this Act, a study of the State and Federal regulatory restrictions to aquaculture development in the United States. The study shall—

(1) include a literature review and a descriptive list identifying overall parameters of the issue;

(2) identify and list relevant current and pending Federal regulations restricting the development of commercial aquaculture operations;

(3) identify and list relevant current State regulations restricting the development of commercial aquaculture operations in five States selected randomly in five separate geographic regions of the United States;

(4) Conduct case studies of ten commercial aquaculture operations in the United States representing a wide range of marine and fresh water species to determine practical effects of regulatory restrictions on aquaculture; and

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(5) develop a prototypical flow-chart time line utilizing the information obtained in items 1 through 4 to identify those regulations and restrictions that could have the most detrimental effect in establishing commercial aquaculture operations in the United States.

Upon completion of the study, the Secretaries shall submit its results to Congress.

(b) REGULATORY CONSTRAINTS PLAN.—Based on the results of the Regulatory Constraints Study, and within six months of the study's completion, the Secretaries shall formulate a Plan for acting on the study's findings. The Plan will contain specific steps the Federal government can take to remove unnecessarily burdensome regulatory barriers to the initiation and operation of commercial aquaculture ventures. Upon its completion, the Secretaries shall submit the Plan to Congress.

AUTHORIZATION FOR APPROPRIATIONS

SEC. 10. For purposes of carrying out the provisions of this Act (other than sections 9 and 10), there are authorized to be appropriated to the Departments of Agriculture, Commerce, and the Interior, such sums as may be necessary to carry out the programs authorized by this Act.

DISCLAIMER

SEC. 11. Nothing in this Act shall be construed to amend, repeal, or otherwise modify the authority of any Fed-

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eral officer or any Federal department or agency to perform any function, responsibility, or activity authorized under any other provision of law.

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SUMMARY OF S. 1650—NATIONAL AQUACULTURE ACT OF 1979

FINDINGS, PURPOSE, AND POLICY

Section 2 sets forth findings concerning the potential benefits to the U.S. from the development of aquaculture; declares a national policy to encourage that development; and states that the purpose of the bill is to establish a plan and programs to carry out that policy.

DEFINITIONS

Section 3 defines the terms used in the act.

NATIONAL AQUACULTURE DEVELOPMENT PLAN

Section 4 requires the Secretaries of Agriculture, Commerce, and the Interior, within 18 months, to establish a National Aquaculture Development Plan setting forth those actions which the Federal Government should undertake to further the development of aquaculture. The plan shall include programs for each species which has a potential for aquacultural development. This section also requires an on-going assessment of aquaculture to determine the size and nature of the U.S. aquaculture industry.

FUNCTIONS AND POWERS OF SECRETARIES

Section 5 provides that in implementing the Plan, the Secretaries shall provide assistance to all interested persons, shall consult and cooperate with interested persons and agencies and shall encourage the use of aquaculture to rehabilitate and enhance the public fisheries. The Secretaries may conduct tests of aquacultural systems, including production-scale facilities, produce and sell seed stock; and develop methods to enhance stocks of aquatic species. In addition, the Secretaries shall collect and disseminate information relating to aquaculture and shall report to Congress biennially on the status of aquaculture in the United States.

COORDINATION OF NATIONAL ACTIVITIES REGARDING AQUACULTURE

Section 6 establishes the Joint Subcommittee on aquaculture of the Federal Coordinating Council on Science, Engineering and Technology consisting of the Secretaries and the heads of ten other federal agencies with functions relating to aquaculture. The functions of the Committee shall be to ensure a continuing exchange of information relating to aquaculture and to ensure that all Federal agencies with functions relating to aquaculture are carrying out those functions in a manner consistent with the purposes and policy of the Act.

CONTRACTS AND GRANTS

Section 7 provides that the Secretaries may use contracts or grants to carry out the purposes of the Act. Such contracts or grants can be made to any person, federal department or agency, or State agency or regional commission. The grant would be on a cost sharing basis and can only be made if the recipient at least matches the grant.

CAPITAL REQUIREMENTS FOR AQUACULTURE

Section 8 requires the Secretaries, through the Subcommittee, to conduct a study within 12 months of the capital needs of the U.S. aquaculture industry and the role of the Federal government in fulfulling those needs. Within six months of the completion of the studies, the Secretaries shall submit to Congress a Plan for meeting the needs identified in the study.

REGULATORY RESTRAINTS ON AQUACULTURE

Section 9 requires the Secretaries, through the Subcommittee, to conduct a study within 12 months of the regulatory constraints on the development of aquaculture in the U.S. Within six months of the completion of the study, the Secretaries shall submit to Congress a Plan for acting on the study's findings.

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AUTHORIZATION FOR APPROPRIATIONS

Section 10 authorizes to be appropriated to the Departments of Agriculture, Commerce, and the Interior such sums as may be necessary to carry out the provisions of the Act.

DISCLAIMER

Section 11 declares that this Act does not amend, repeal, or modify the authority of any Federal department or agency authorized under any other law.

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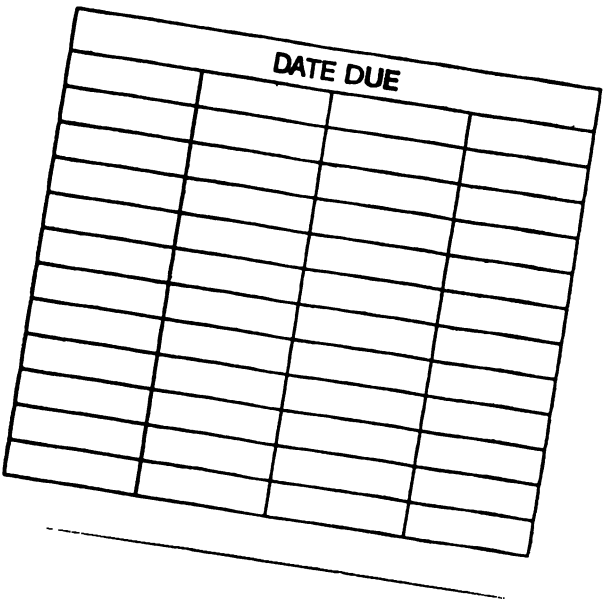

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